

1000

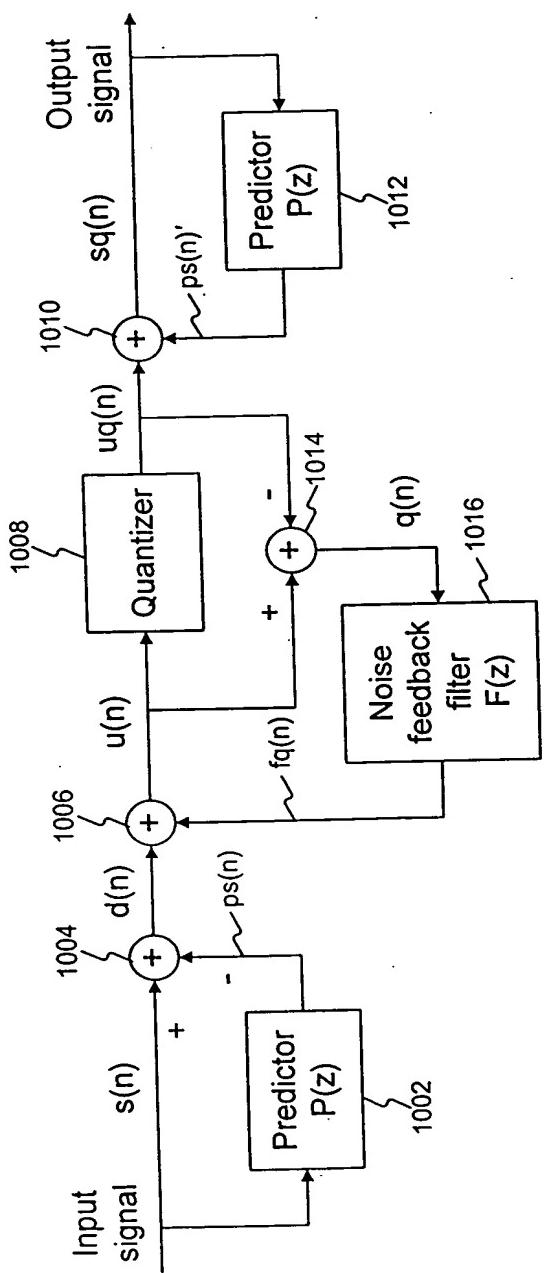


Figure 1 Conventional Noise Feedback Coding

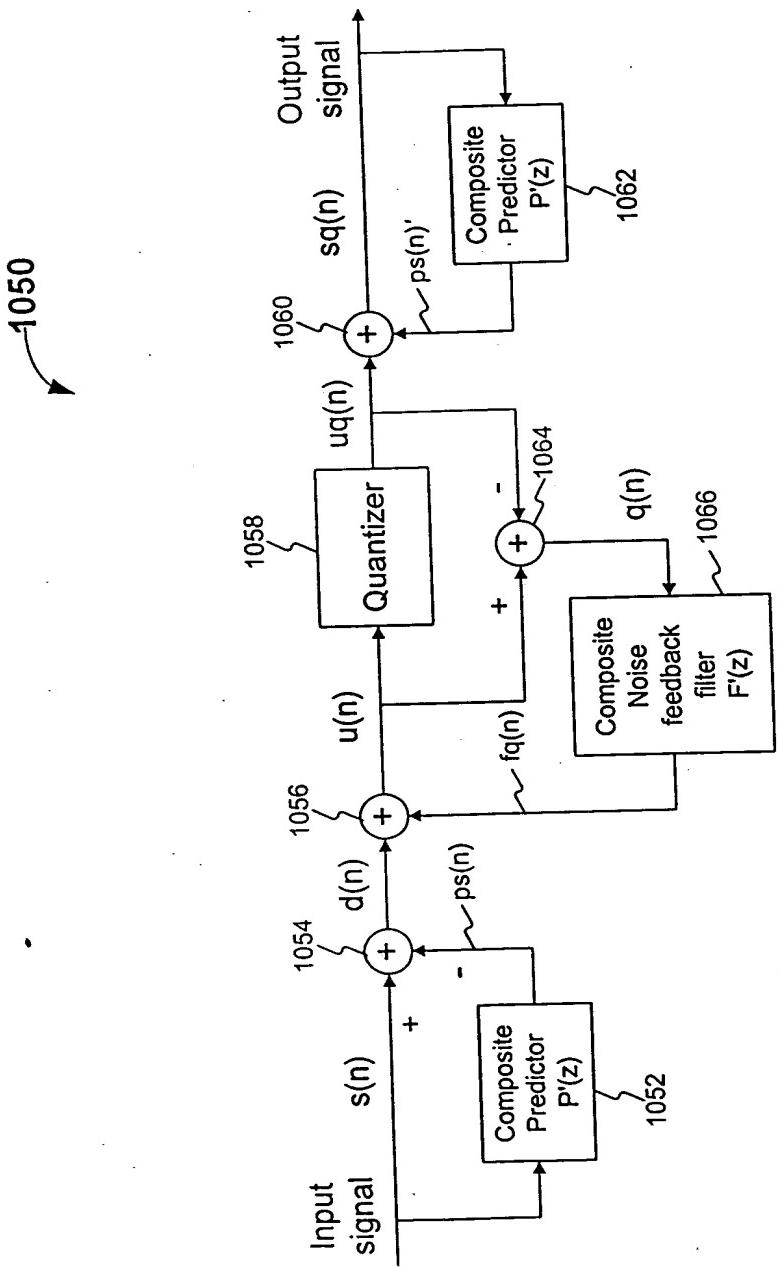


Figure 1A Noise Feedback Coding Using Composite Short-Term and Long-Term Predictors and Composite Short-Term and Long-Term Filter

2000

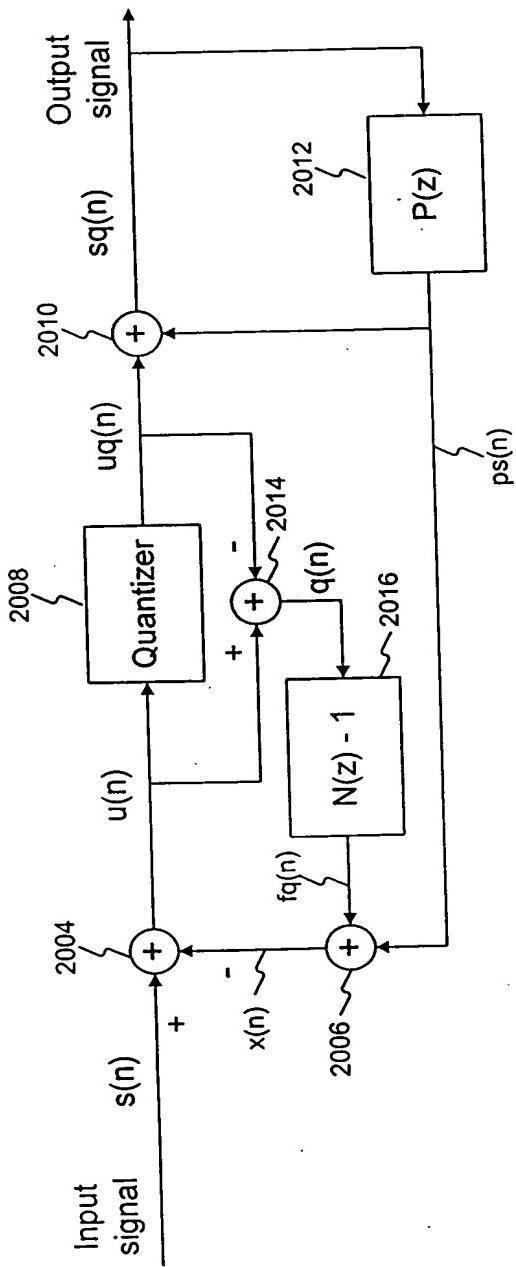


Figure 2 An alternative form of conventional Noise Feedback Coding

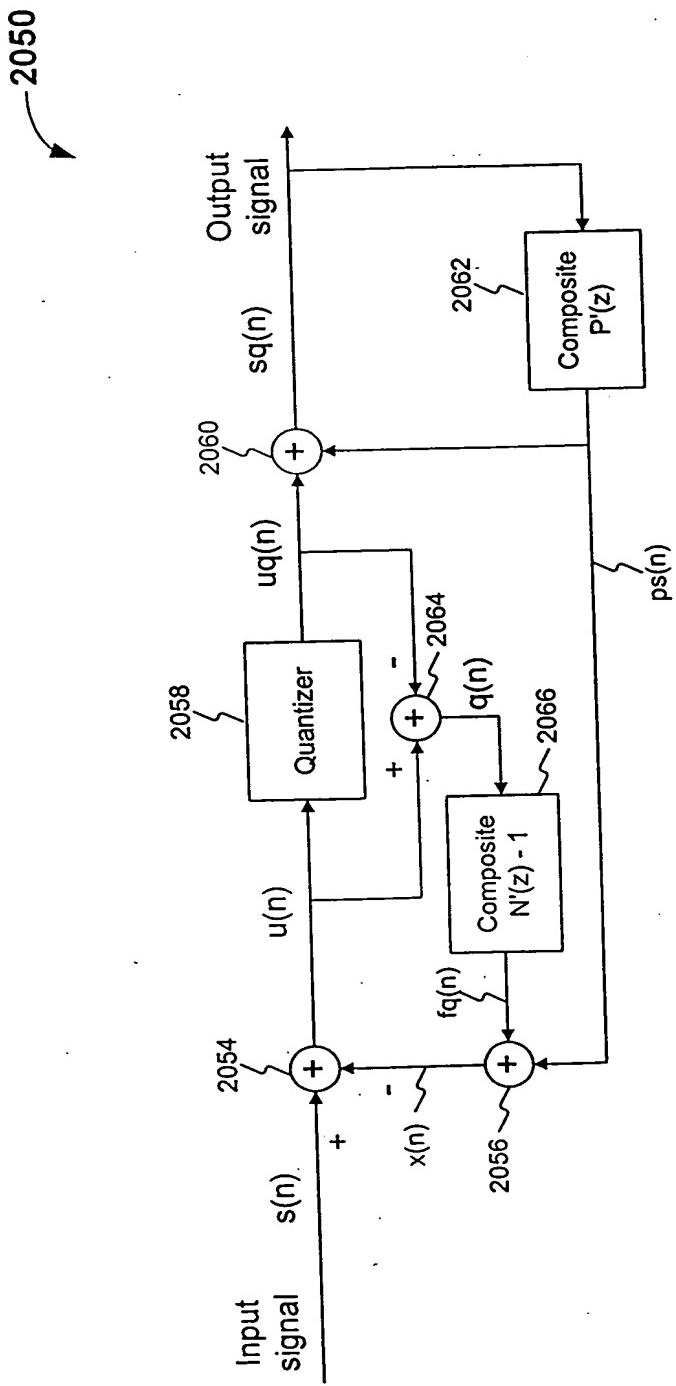


Figure 2A Noise Feedback Coding Using Composite Predictor and  
Composite Noise Filter

3000

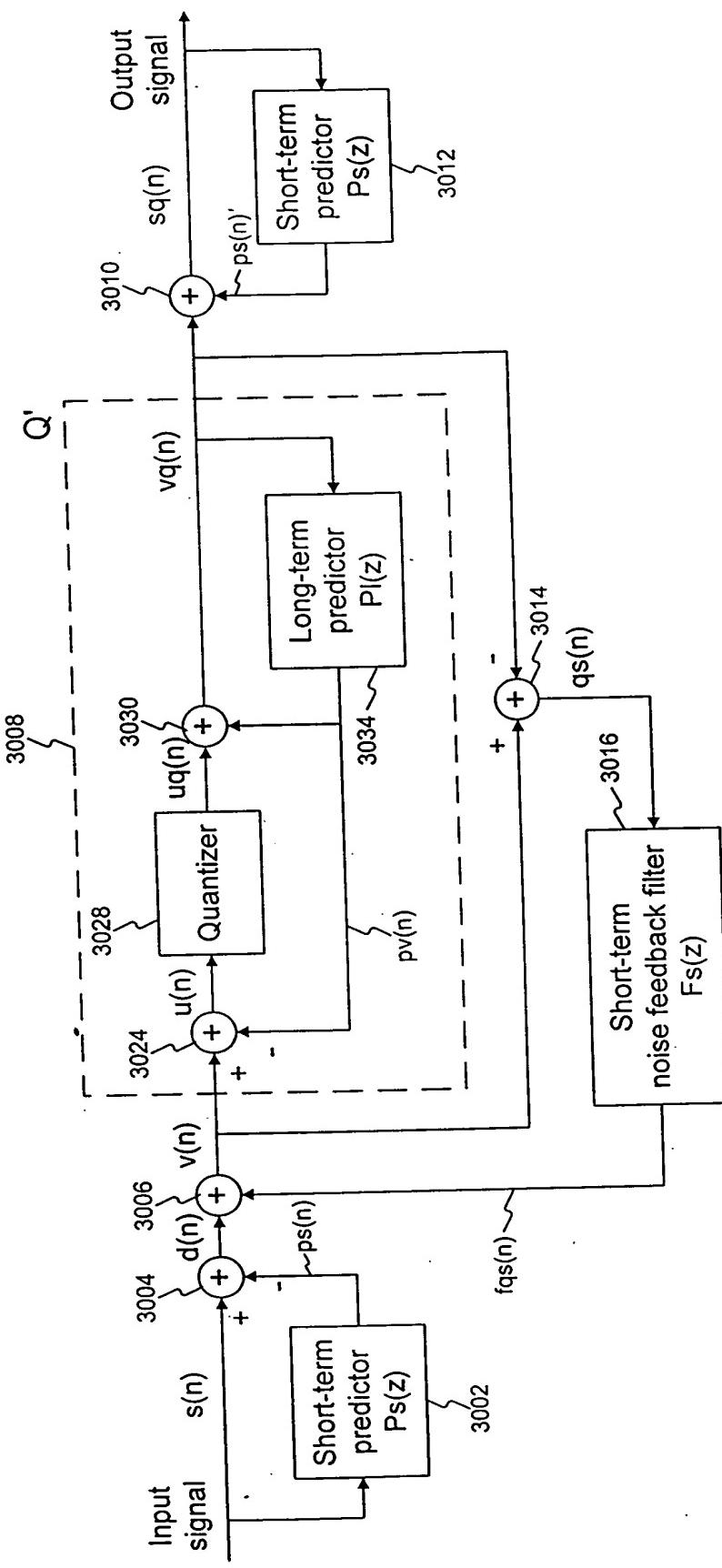


Figure 3 Noise Feedback Coding with short-term and long-term prediction but only short-term noise spectral shaping

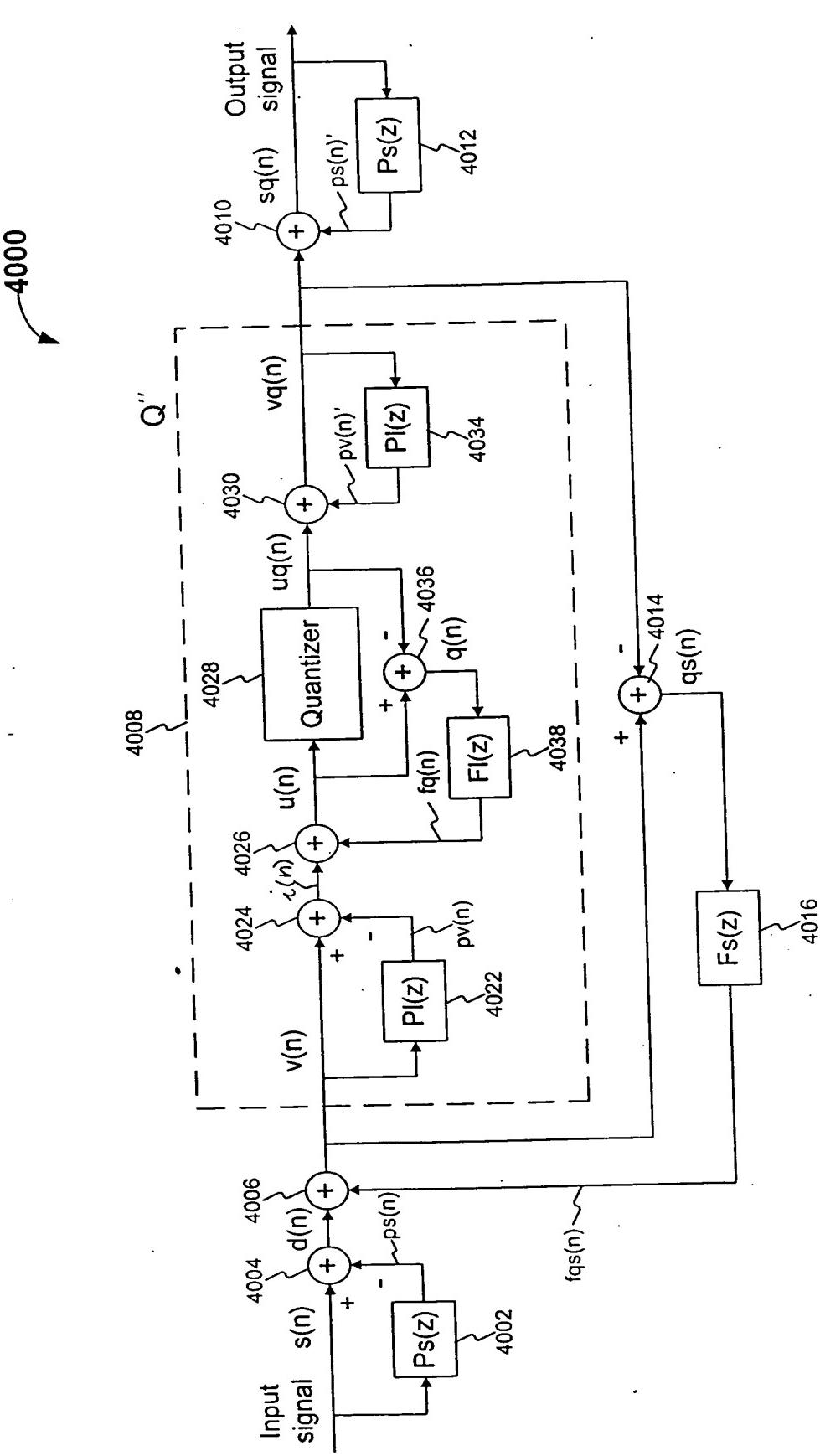


Figure 4 Nested two-stage Noise Feedback Coding structure with short-term and long-term prediction and short-term and long-term noise spectral shaping

5000

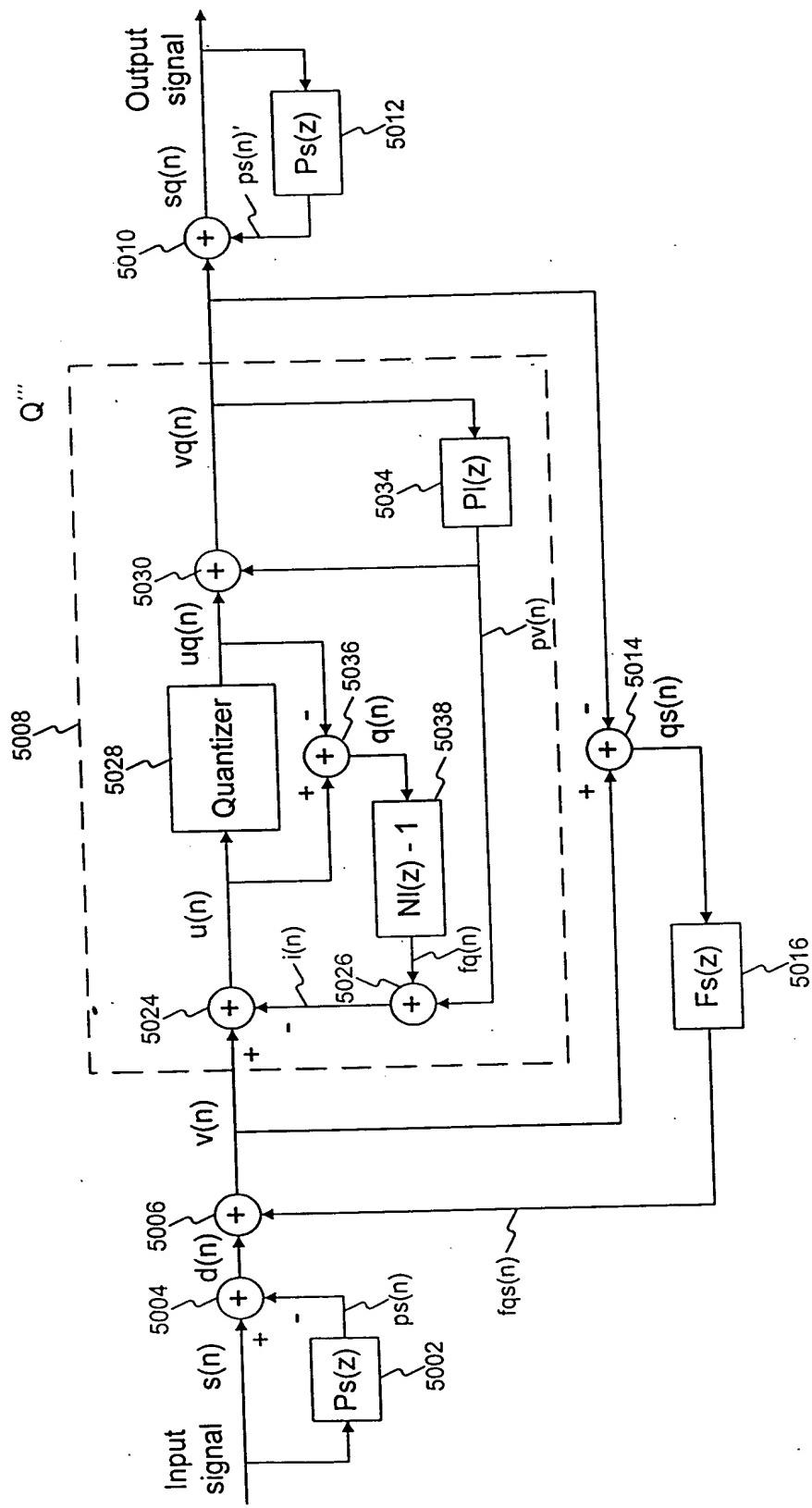


Figure 5 An alternative nested two-stage Noise Feedback Coding structure with short-term and long-term prediction and short-term and long-term noise spectral shaping

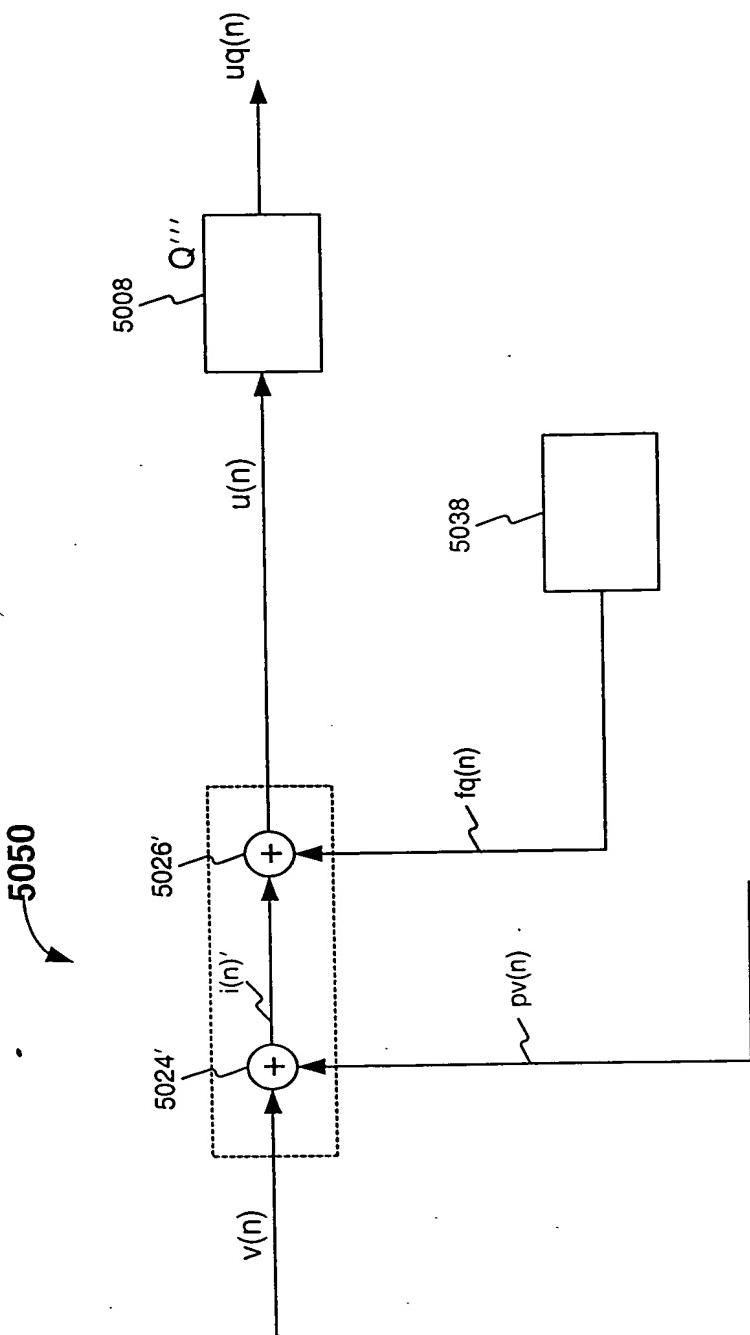


FIG. 5A

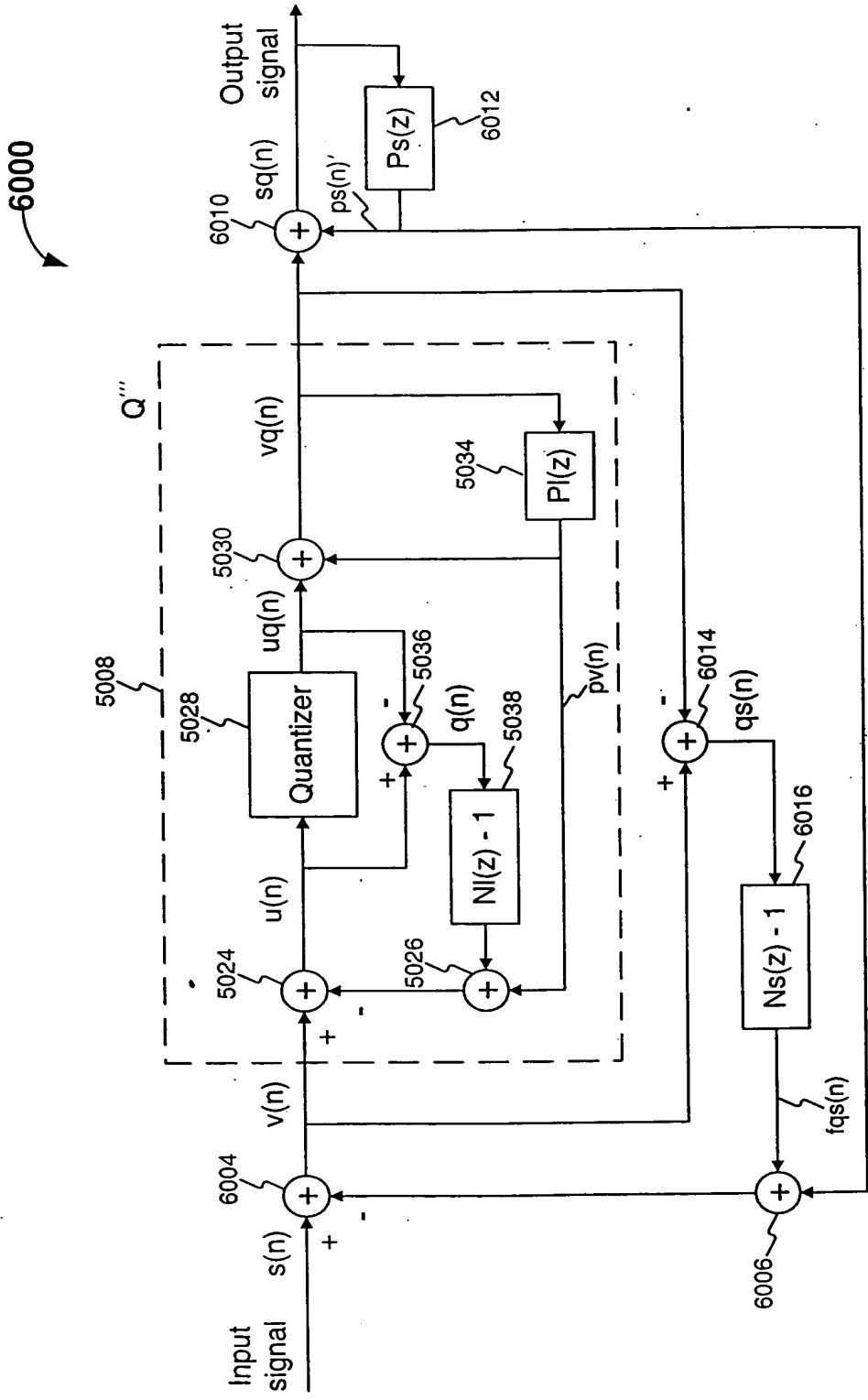
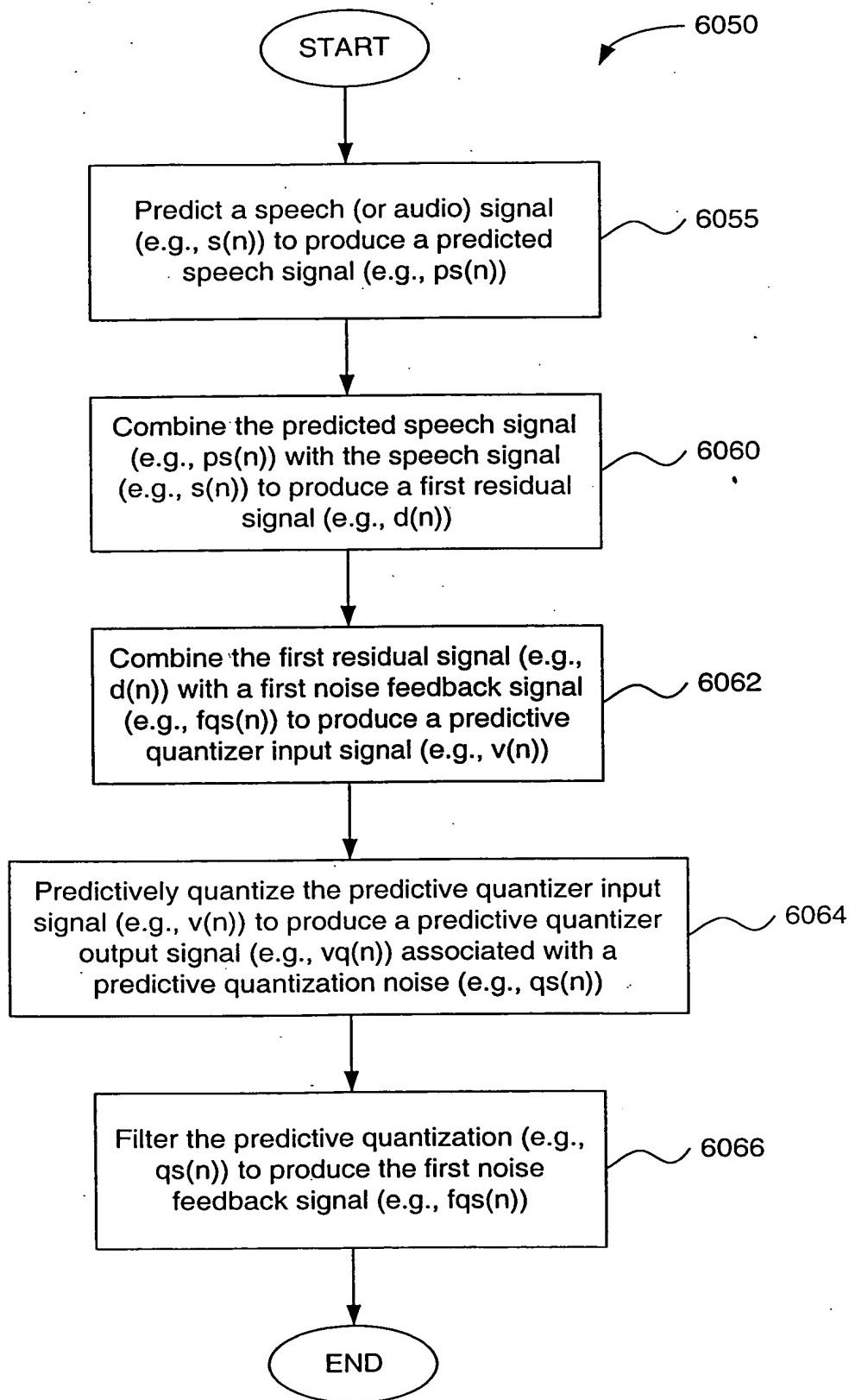
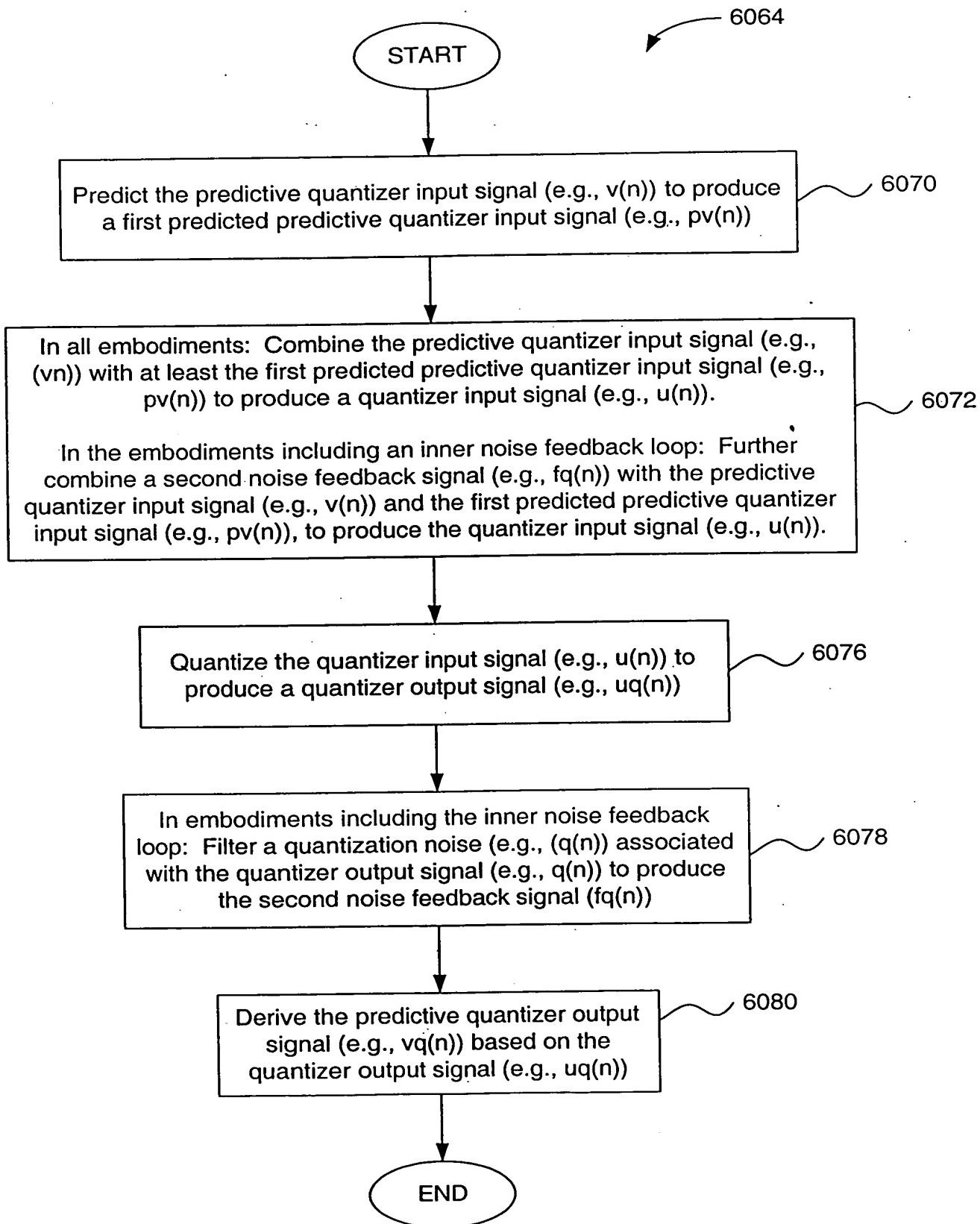


Figure 6 Another alternative nested two-stage Noise Feedback Coding structure with short-term and long-term prediction and short-term and long-term noise spectral shaping

0003-56.vsd/23



**FIG. 6A**



**FIG. 6B**

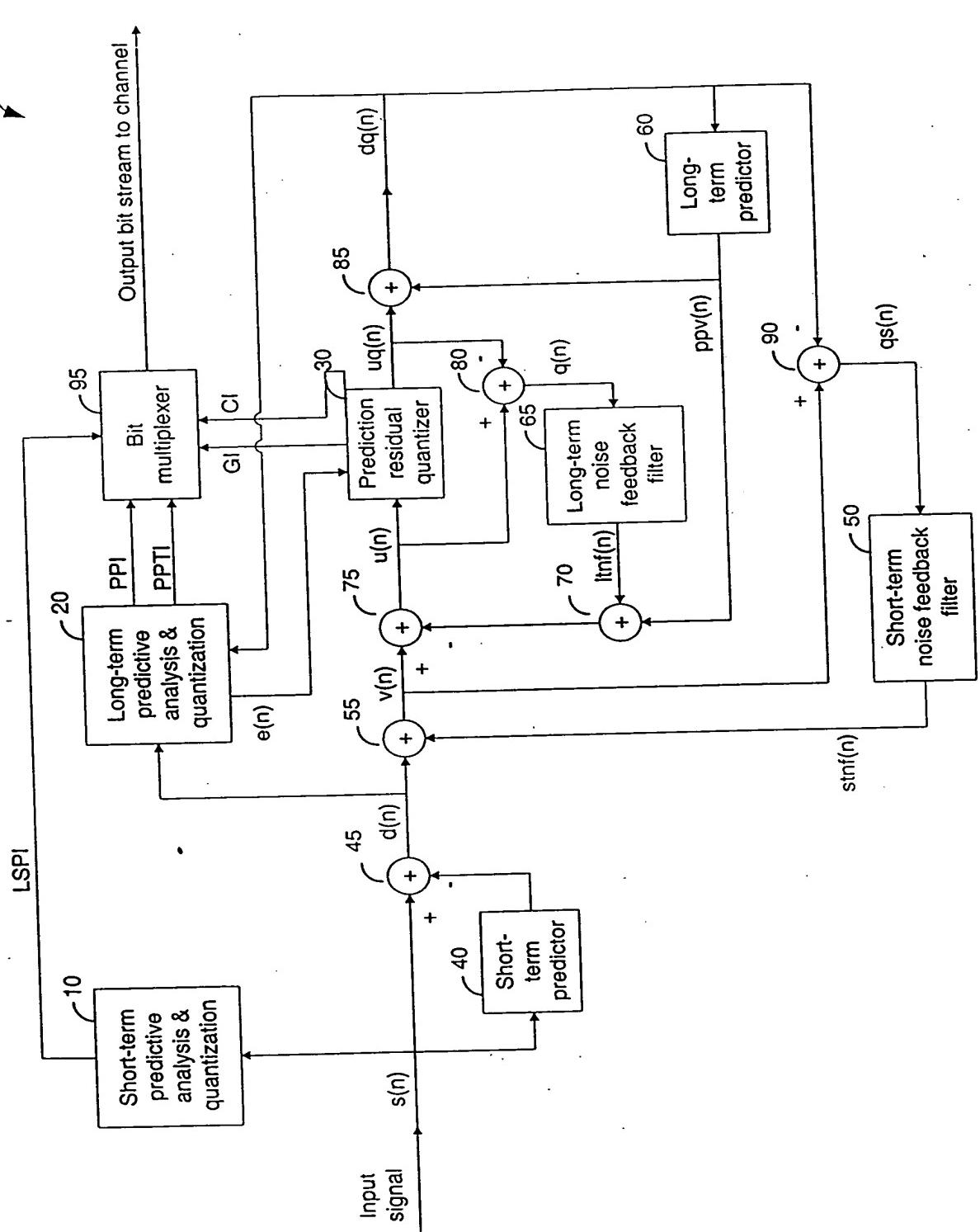


Figure 7 Encoder of a nested two-stage noise feedback codec (TSNFC)

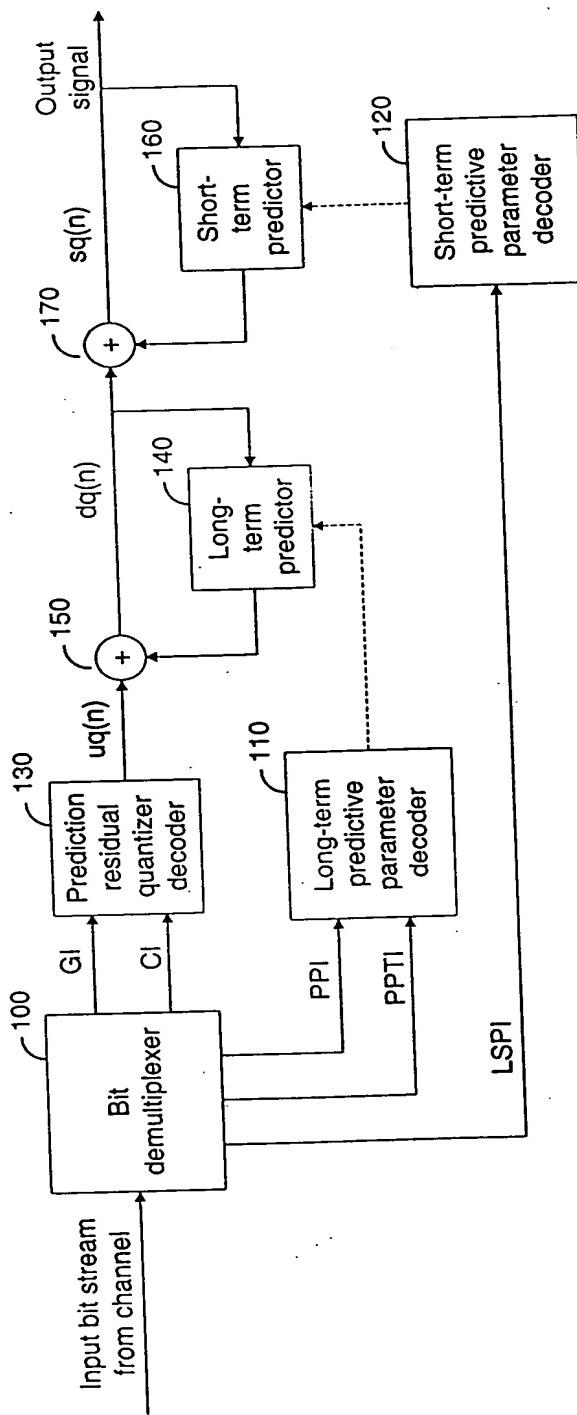


Figure 8 Decoder corresponding to the TSNFC encoder in Fig. 7

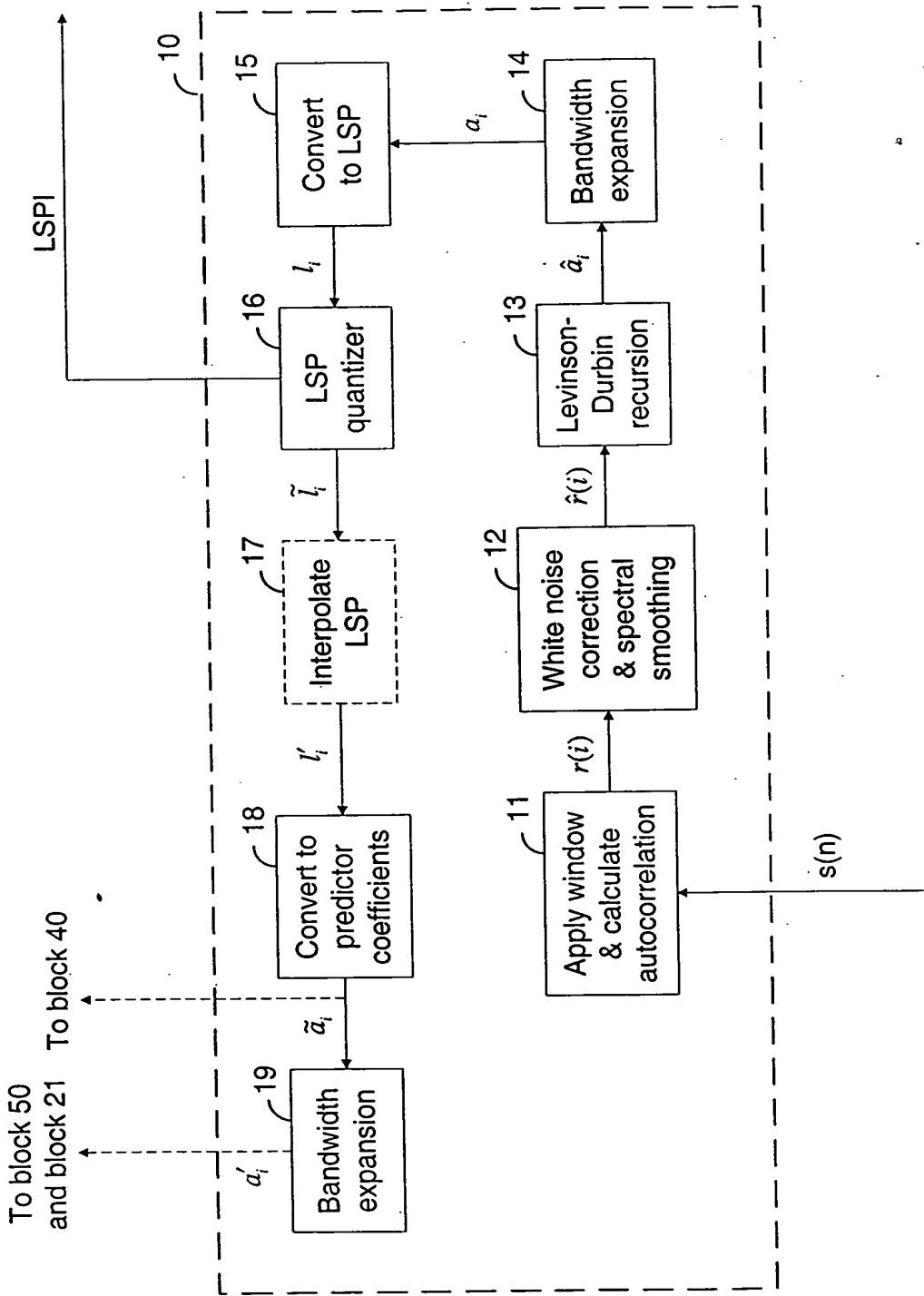


Figure 9 Short-term predictive analysis and quantization (block 10)

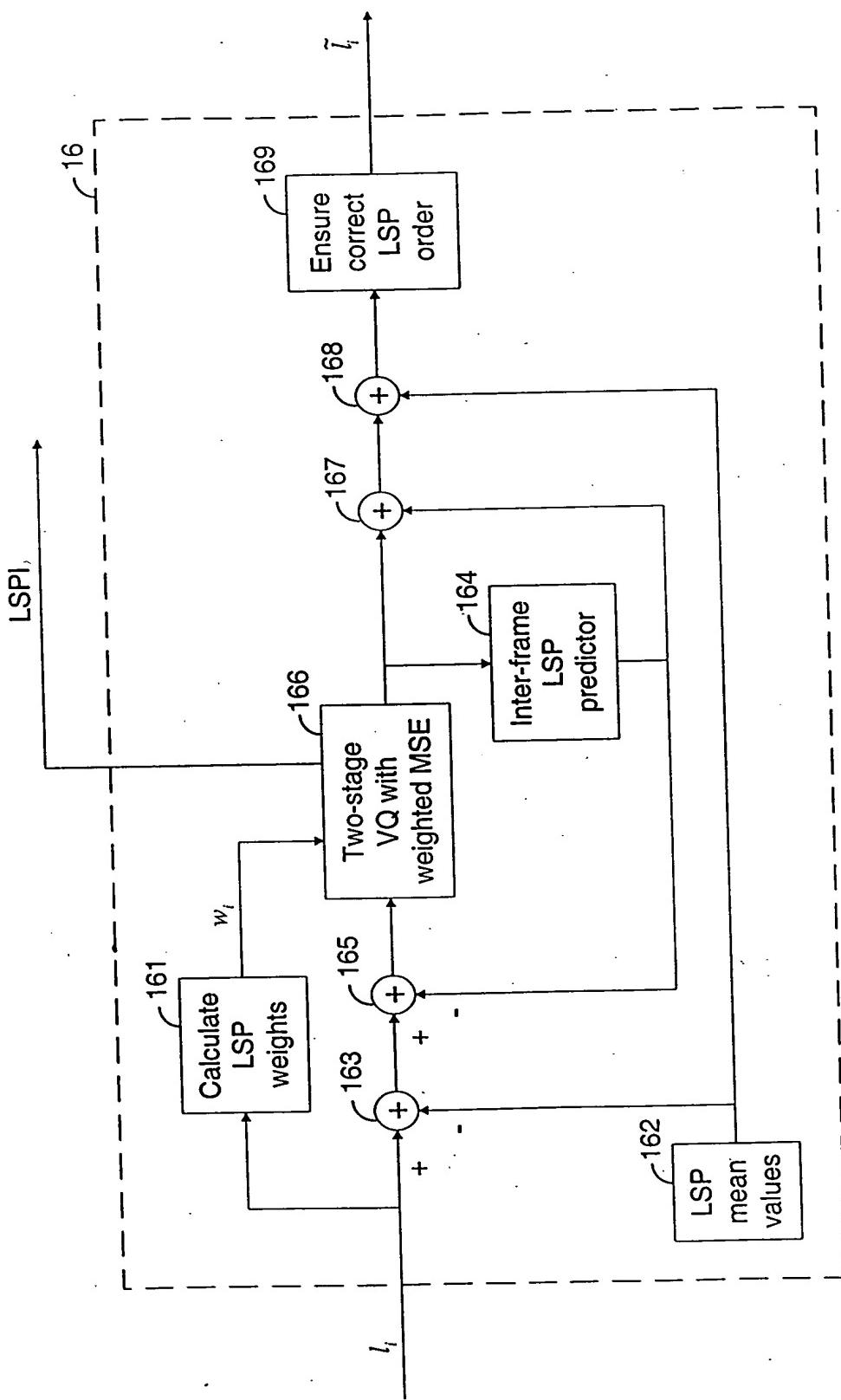


Figure 10 LSP quantizer (block 16)

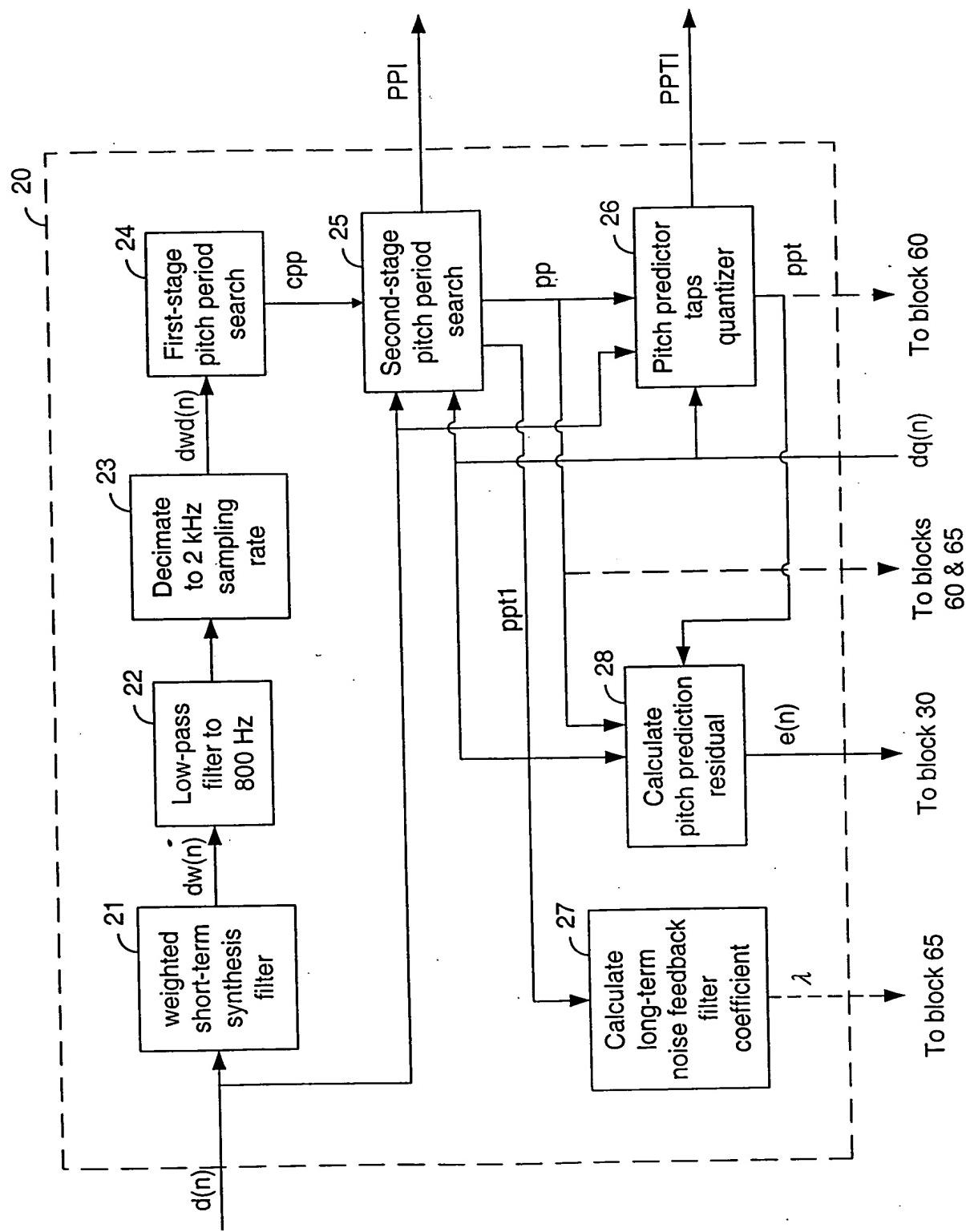


Figure 11 Long-term predictive analysis and quantization (block 20)

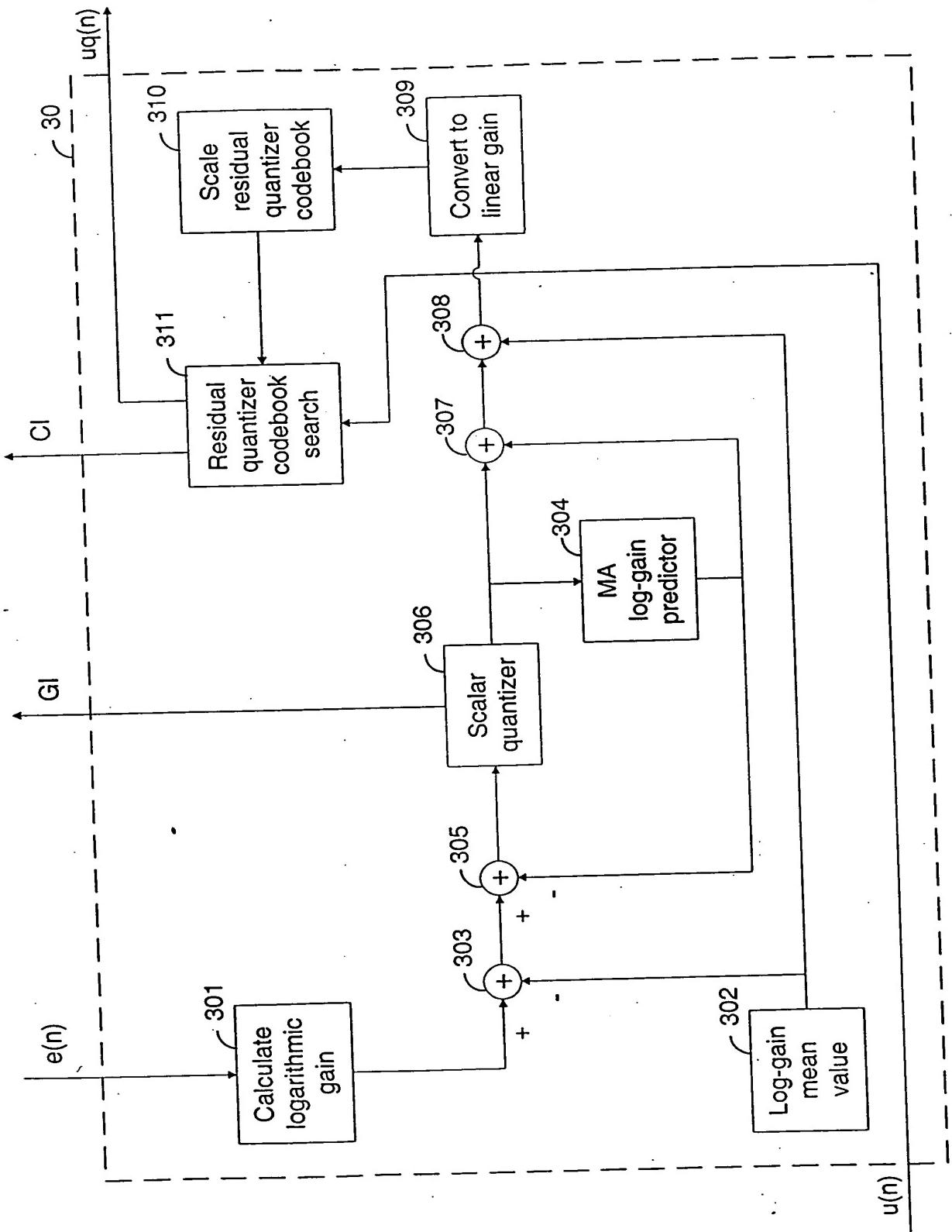
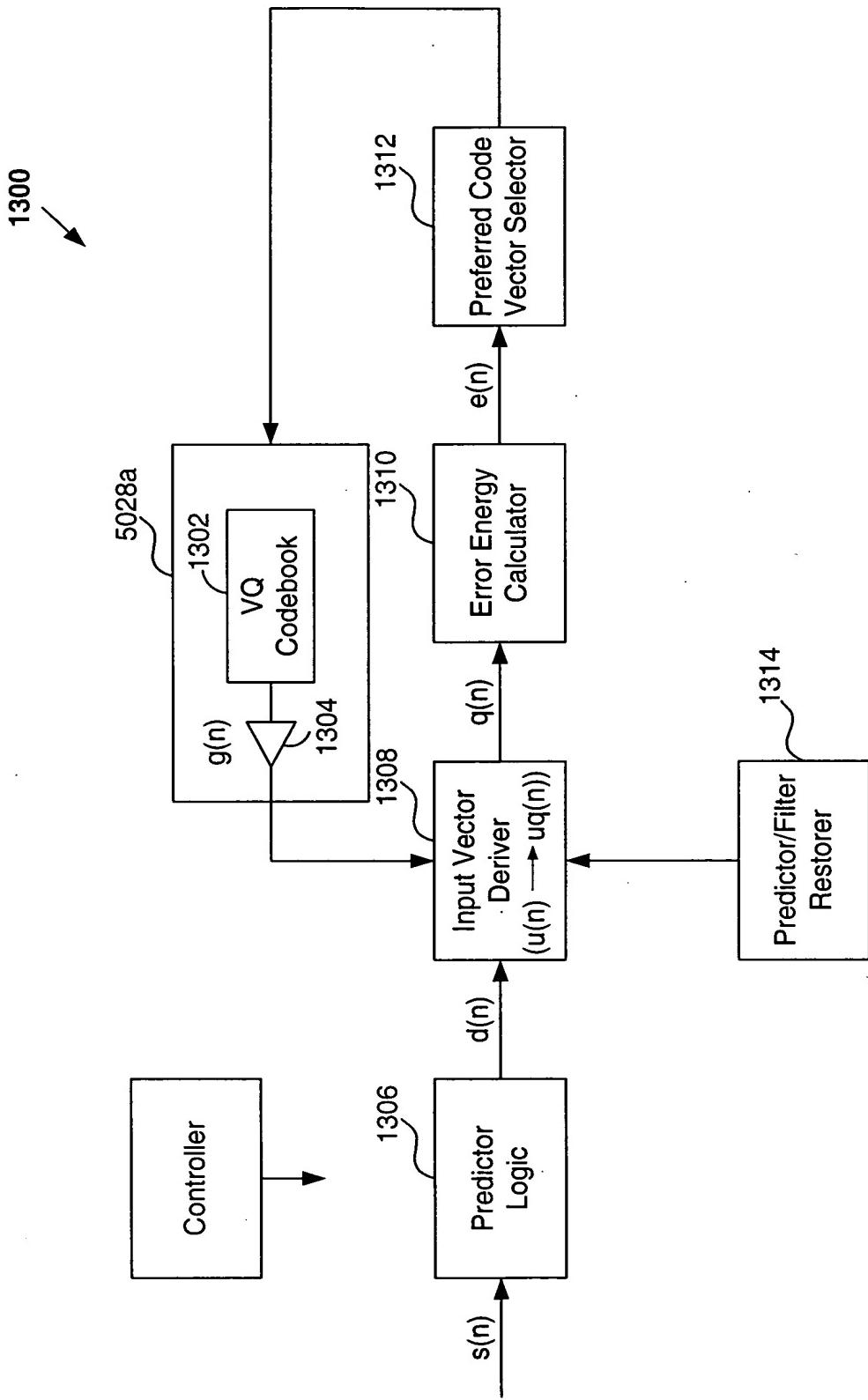
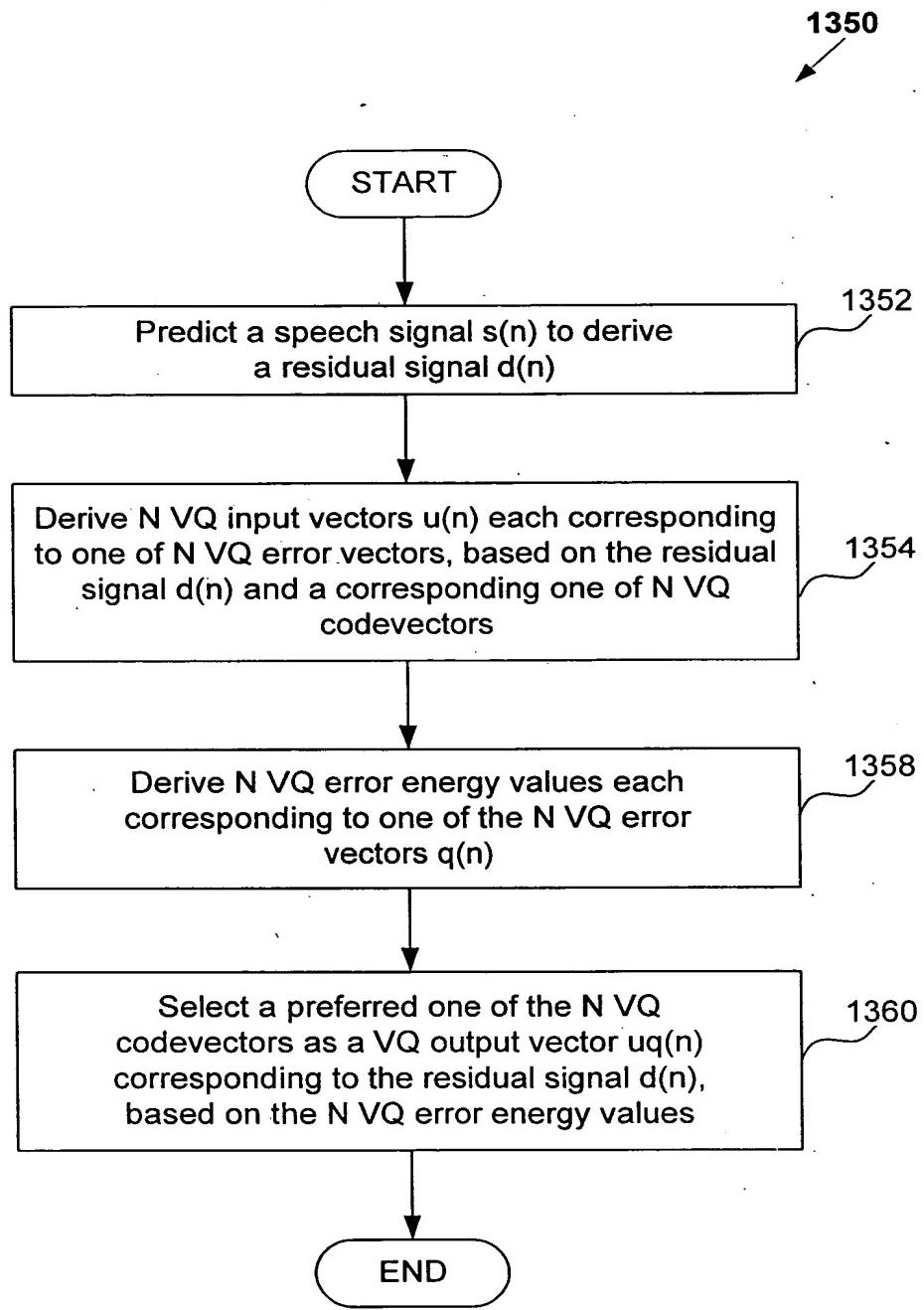


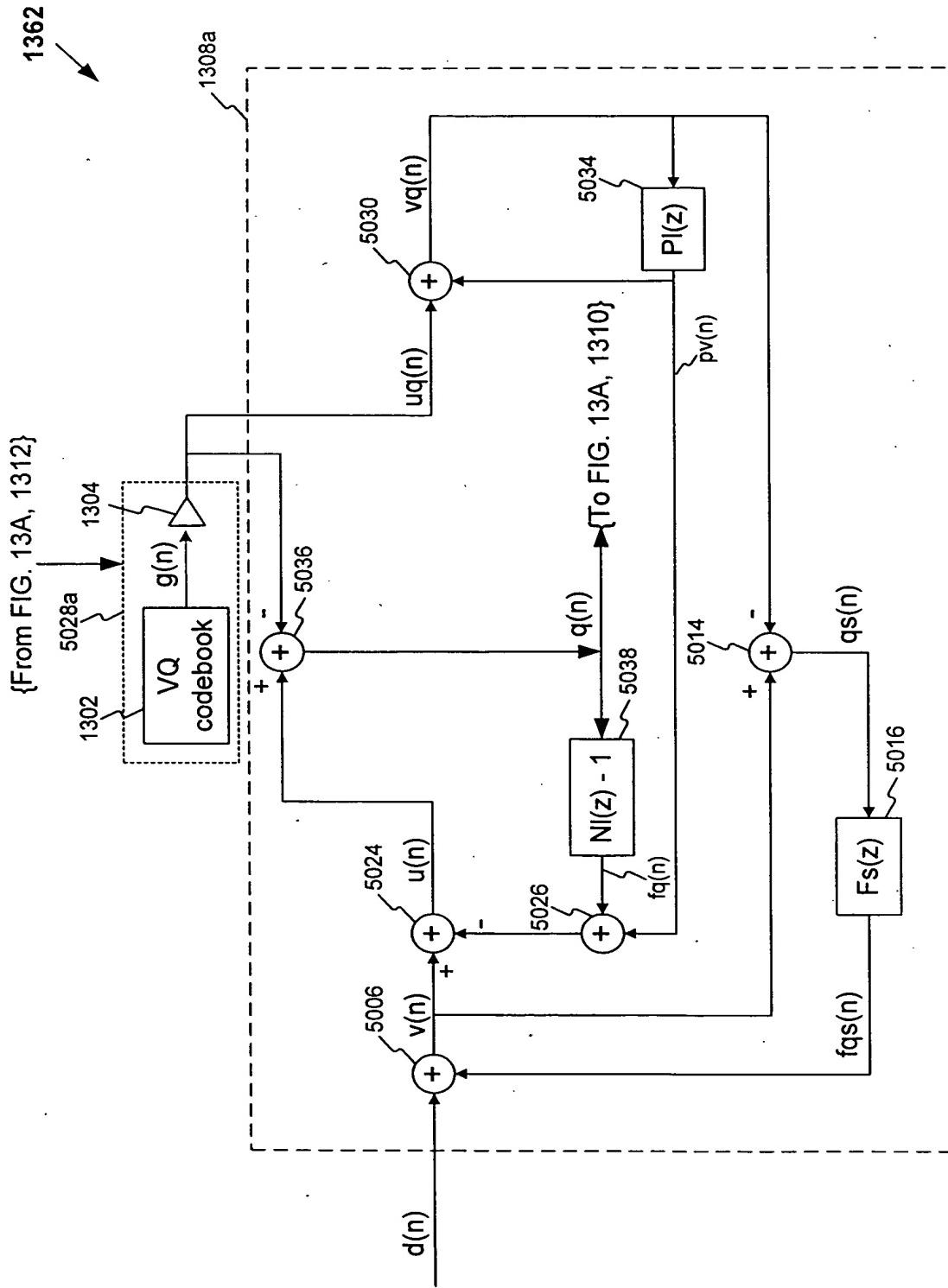
Figure 12 Prediction residual quantizer (block 30)



**FIG. 13A**

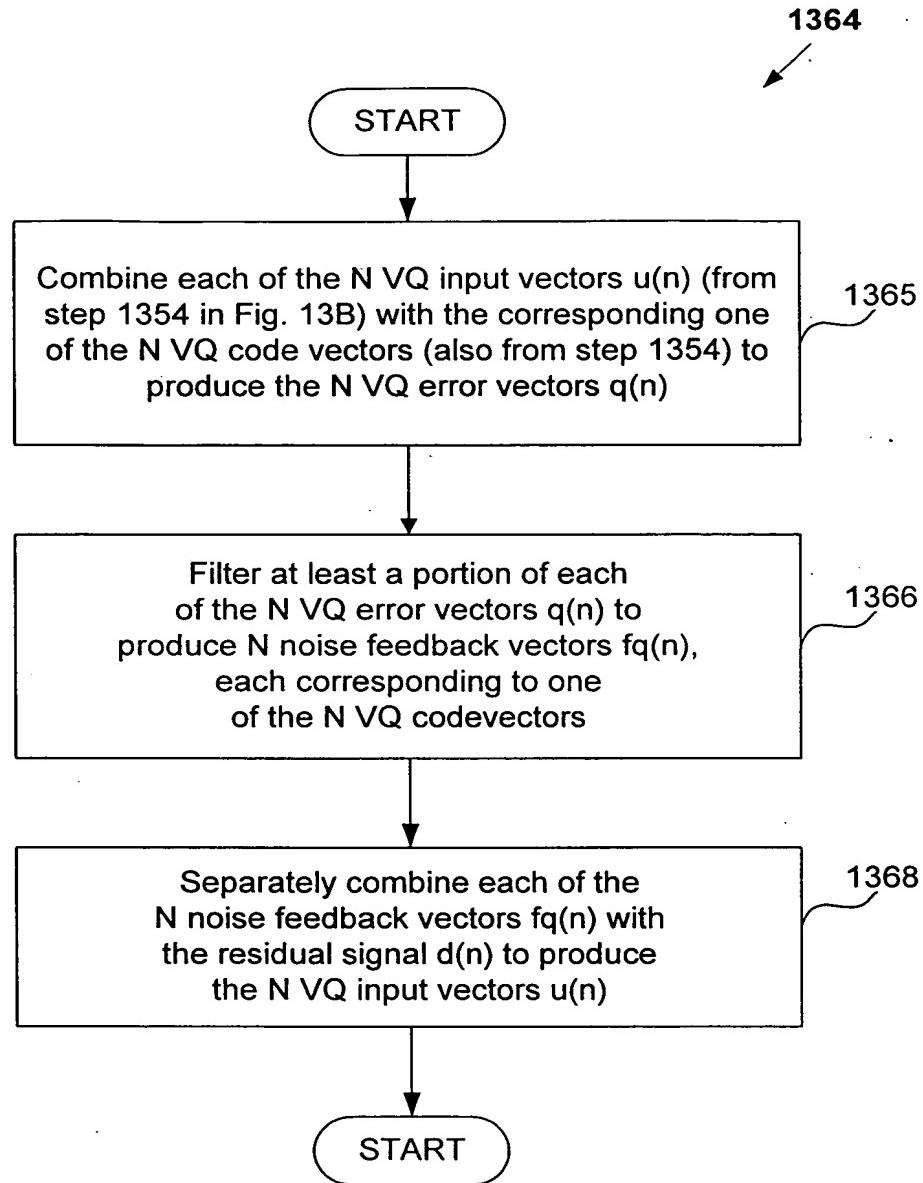


**FIG. 13B**

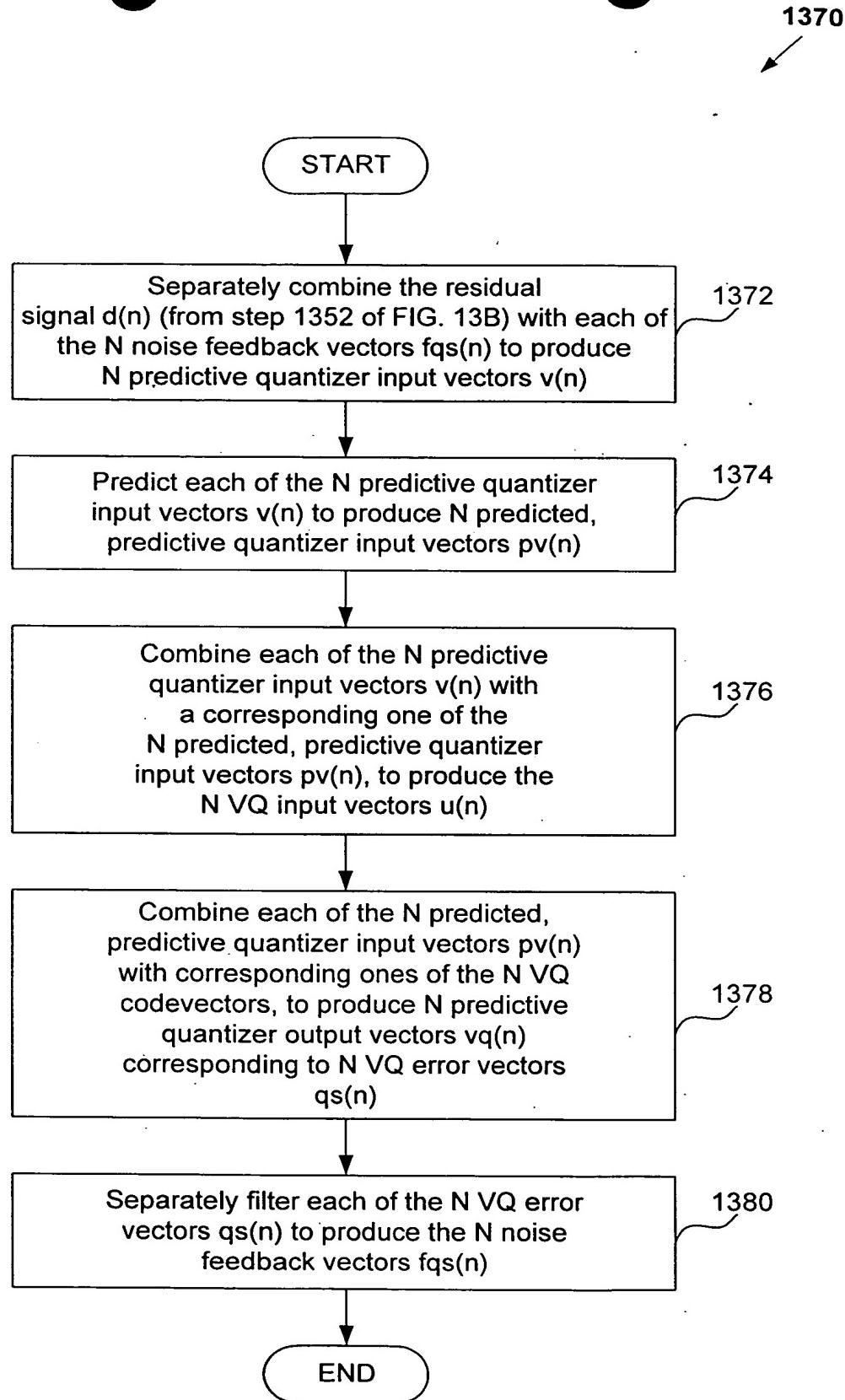


The portion of the codec structure that is used in prediction residual VQ codebook search of the two-stage noise feedback codec of Fig. 5.

FIG. 13C



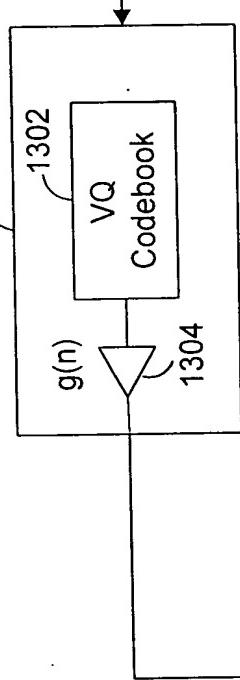
**FIG. 13D**



**FIG. 13E**

1400

5028a



1402

ZERO-INPUT  
Response Filter  
Structure $qzi(n)$ 

1306

Predictor  
Logic $d(n)$ 

Restorer

ZERO-STATE  
Response Filter  
Structure

1404

1414

1400

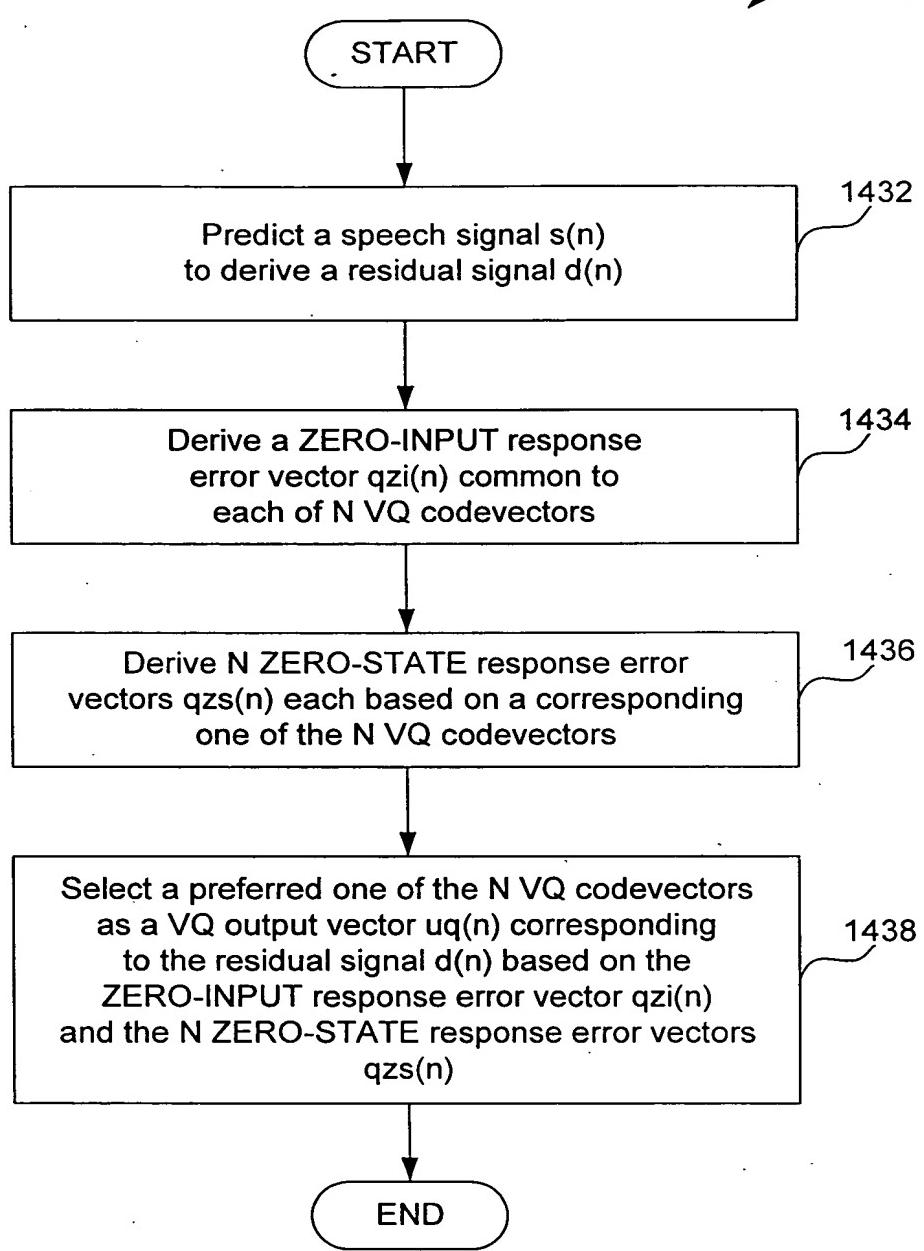
1412

Preferred  
Codevector  
Selector

1410

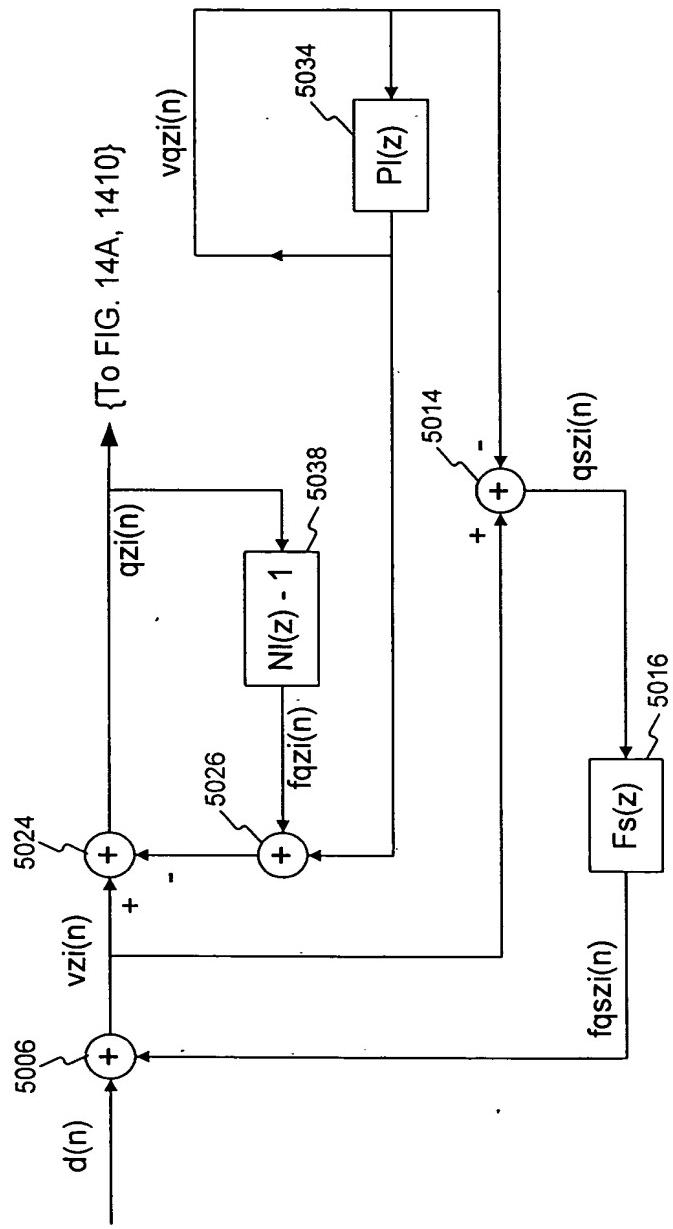
Error Energy  
Calculator $qzs(n)$ 

FIG. 14A



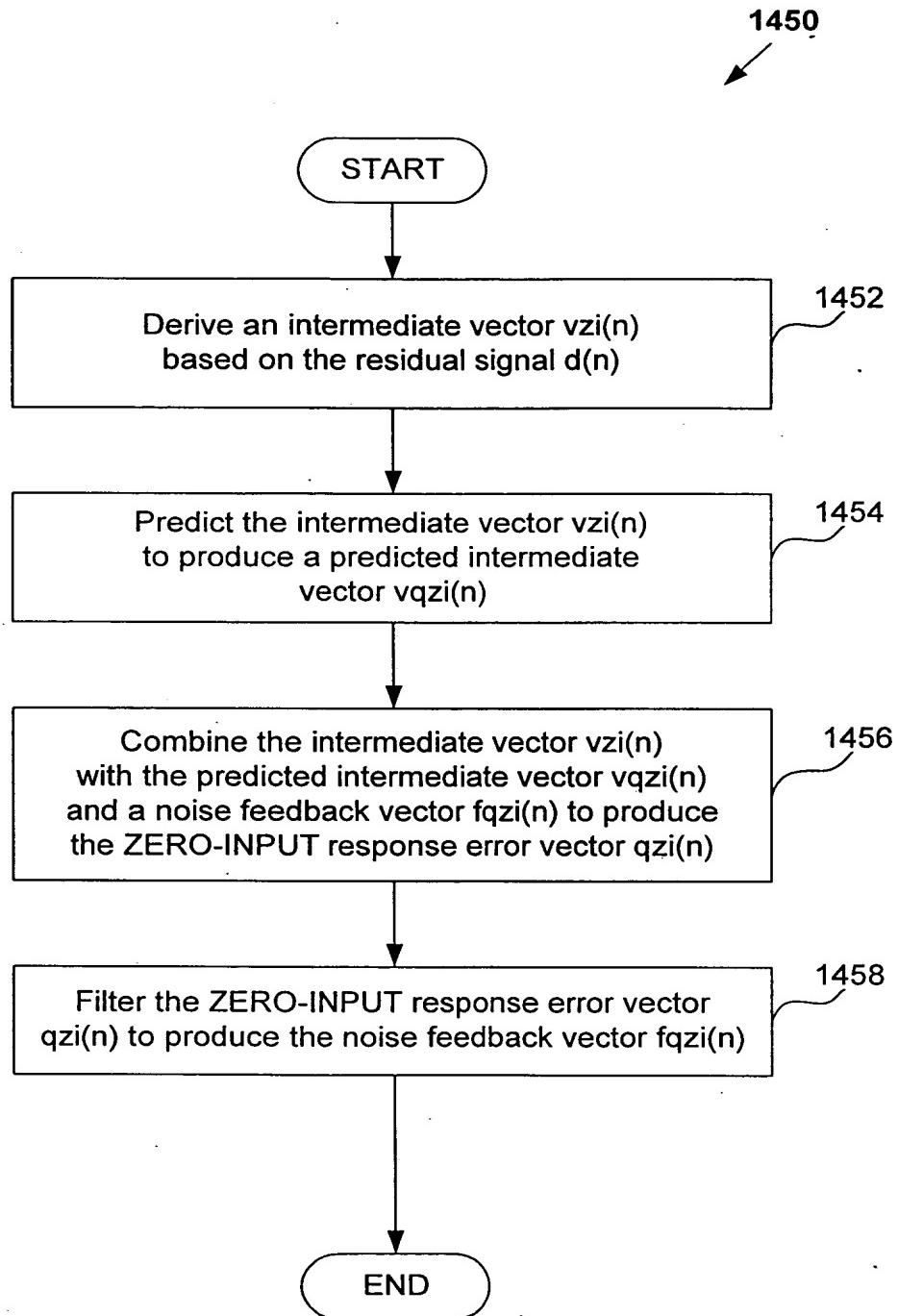
**FIG. 14B**

1402a



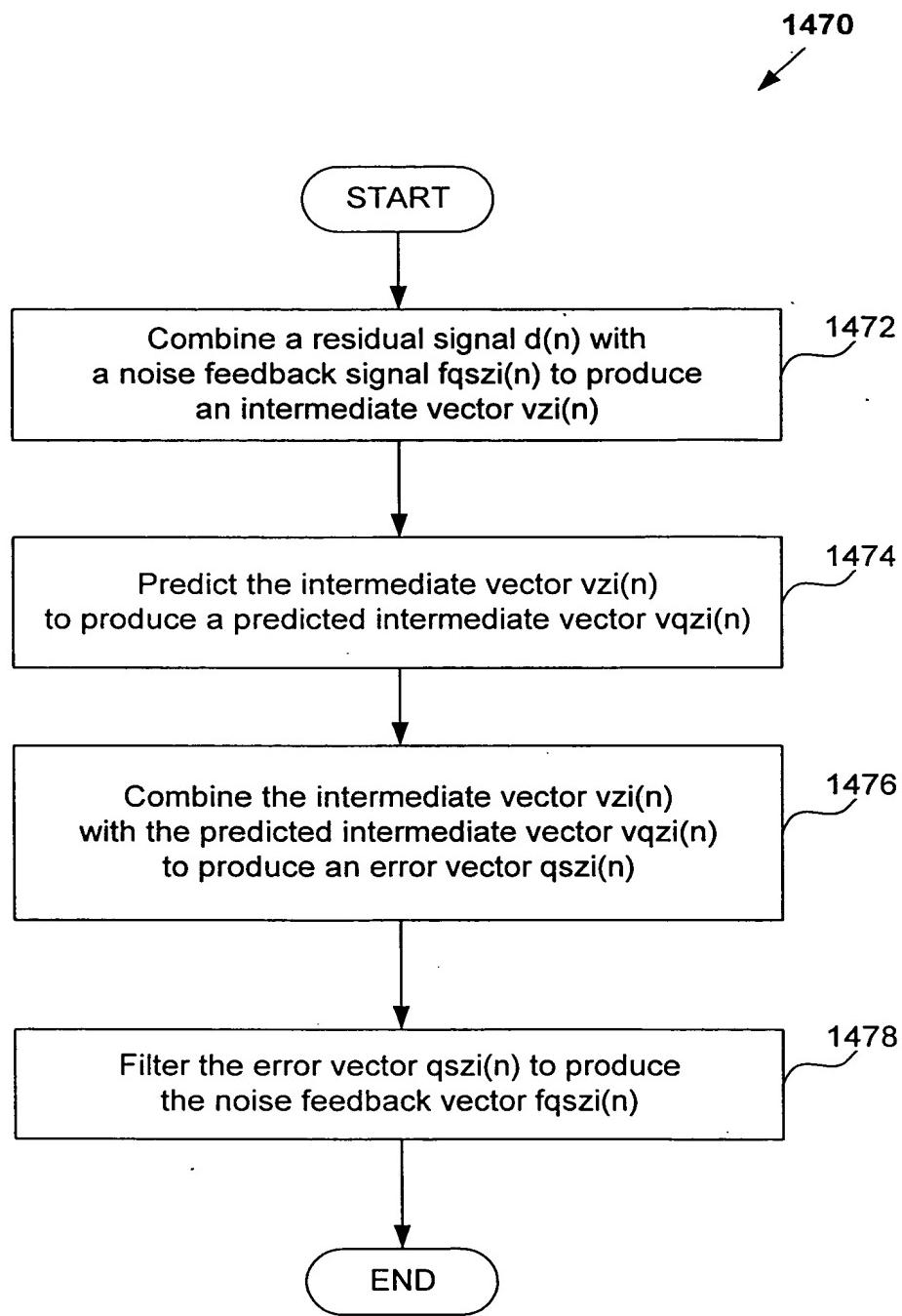
Filter structure during the calculation of the zero-input response of  $q(n)$  of Fig. 13C.

FIG. 14C



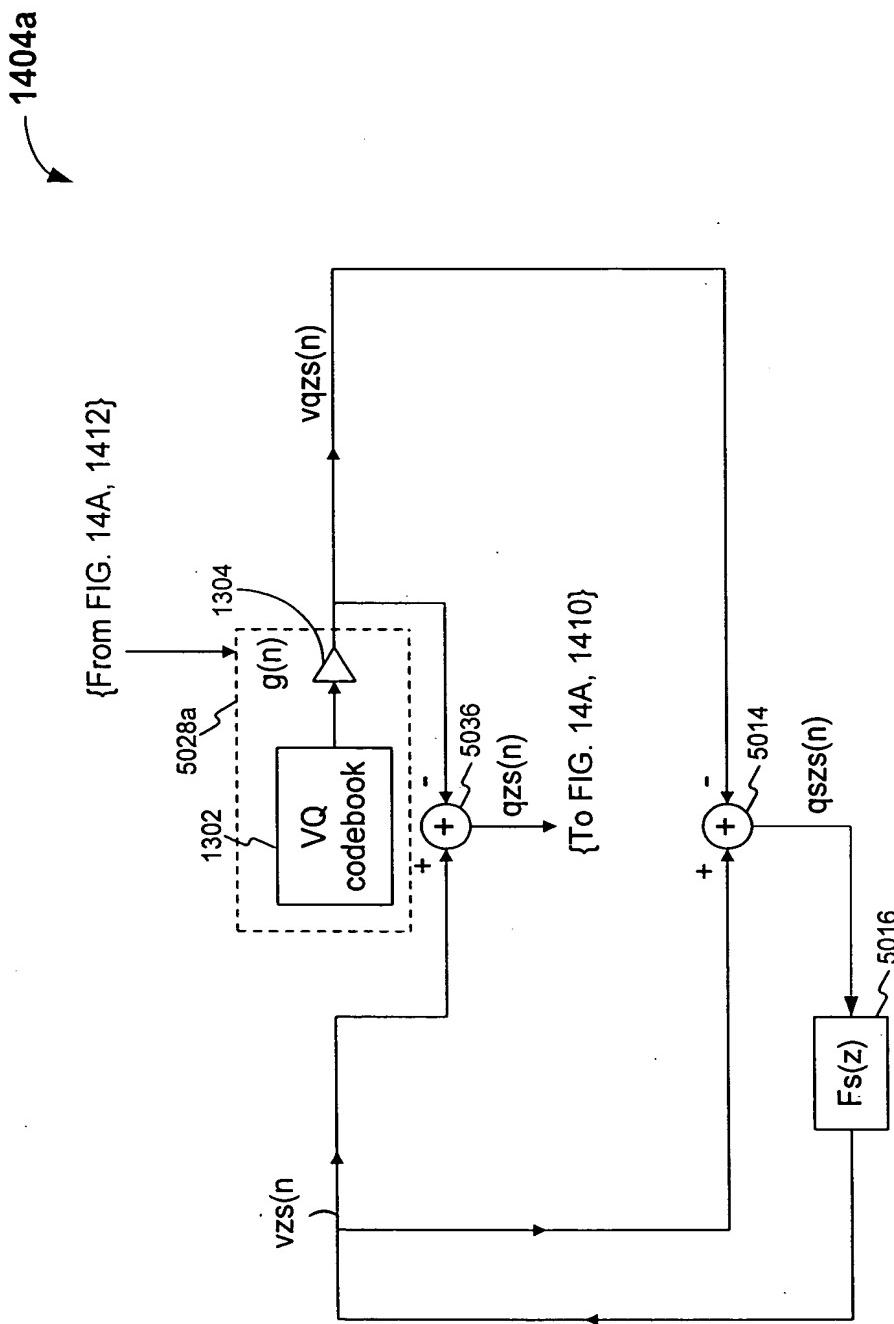
**FIG. 14D**

000000000000000000000000

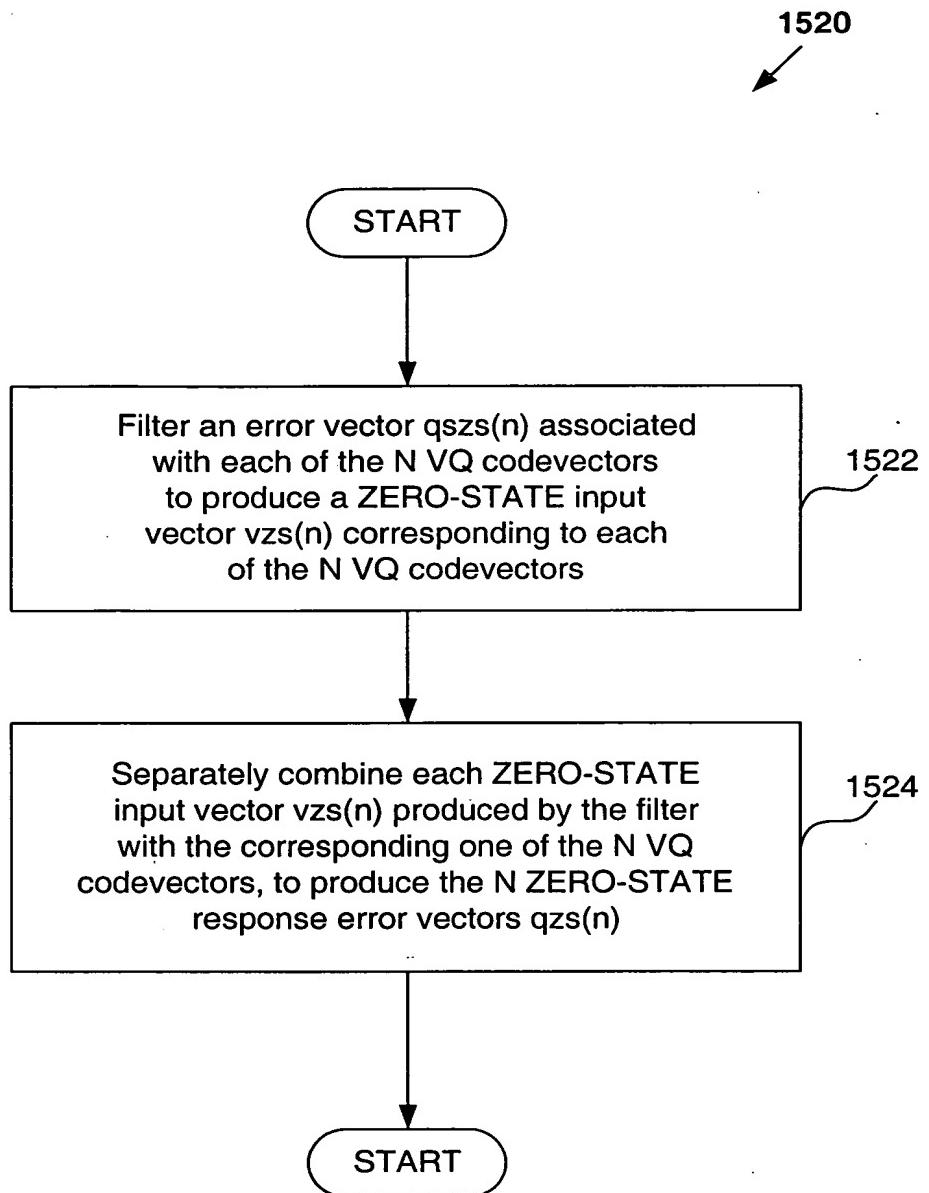


**FIG. 14E**

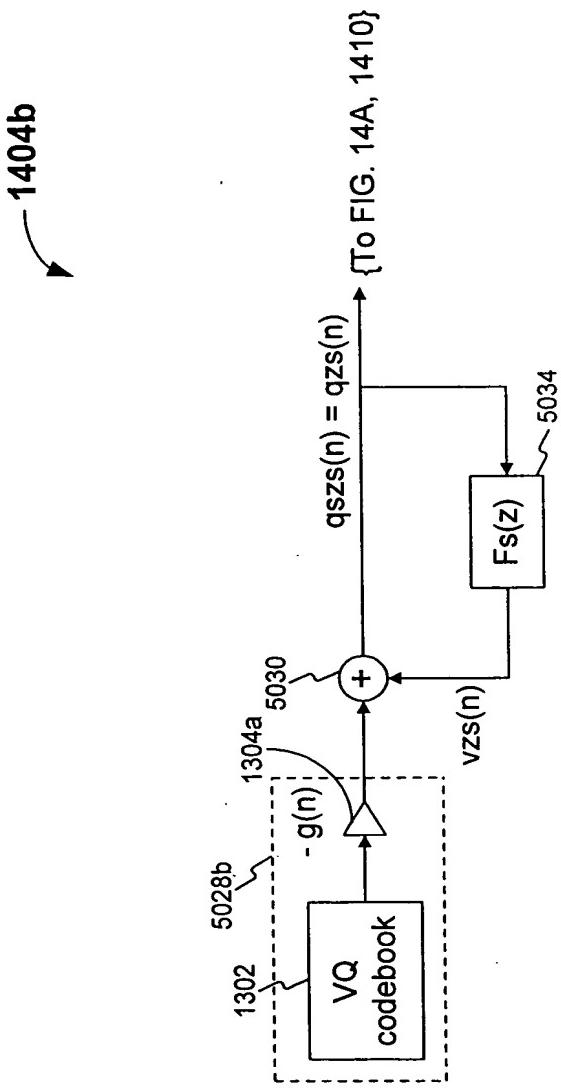
**FIG. 15A**



Filter structure during the calculation of the zero-state response of  $q(n)$  in Fig. 13C.

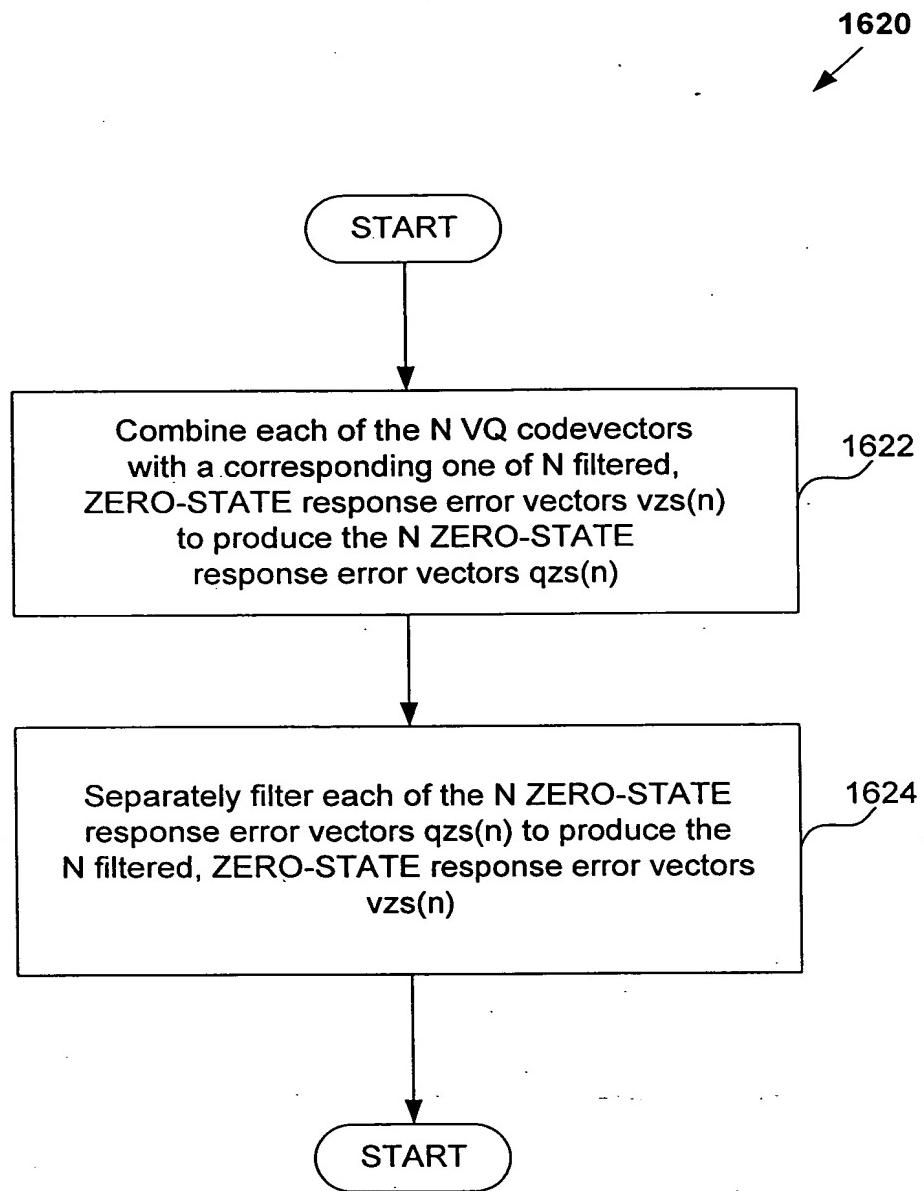


**FIG. 15B**

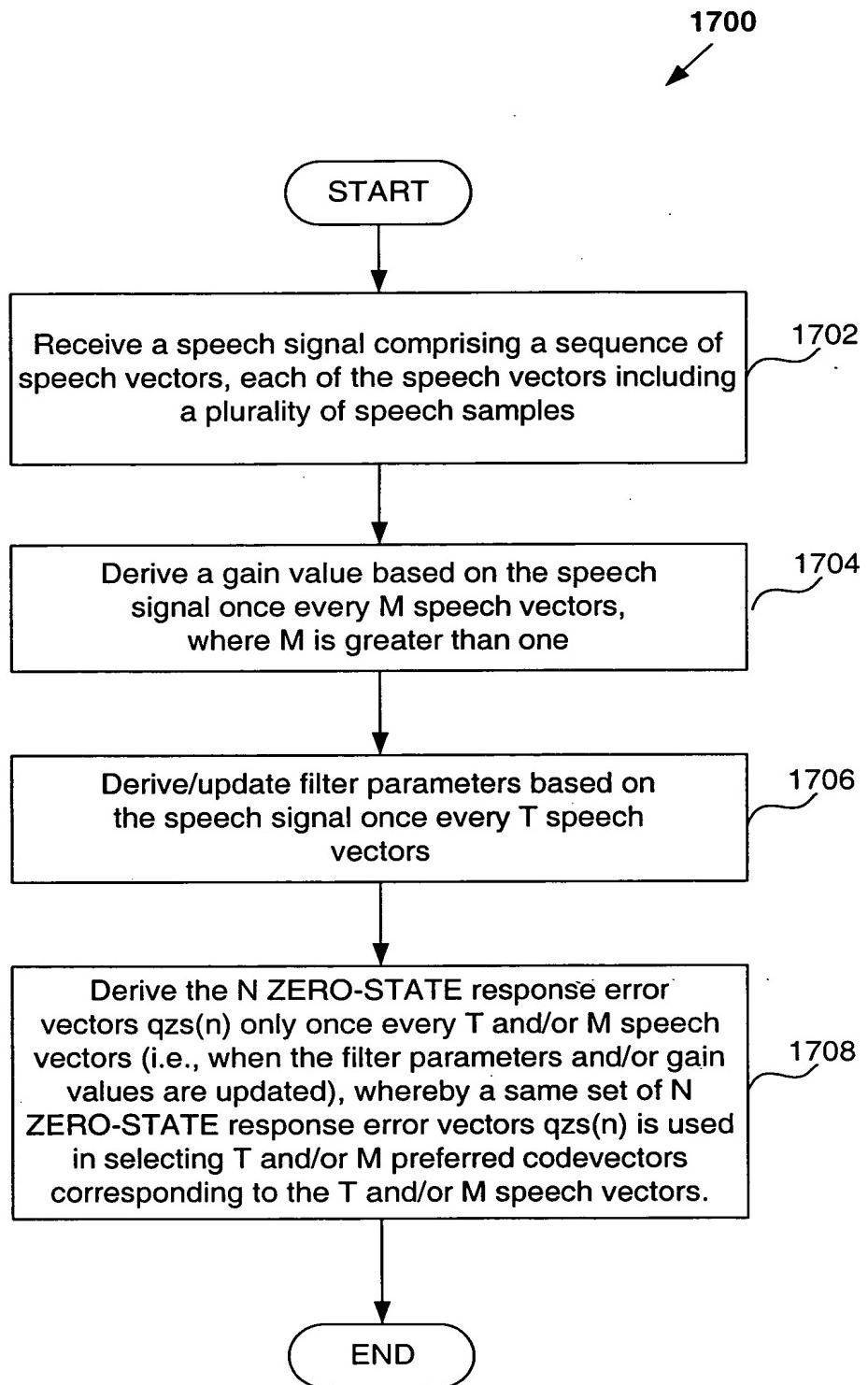


A filter structure equivalent to the structure in Fig. 15A.

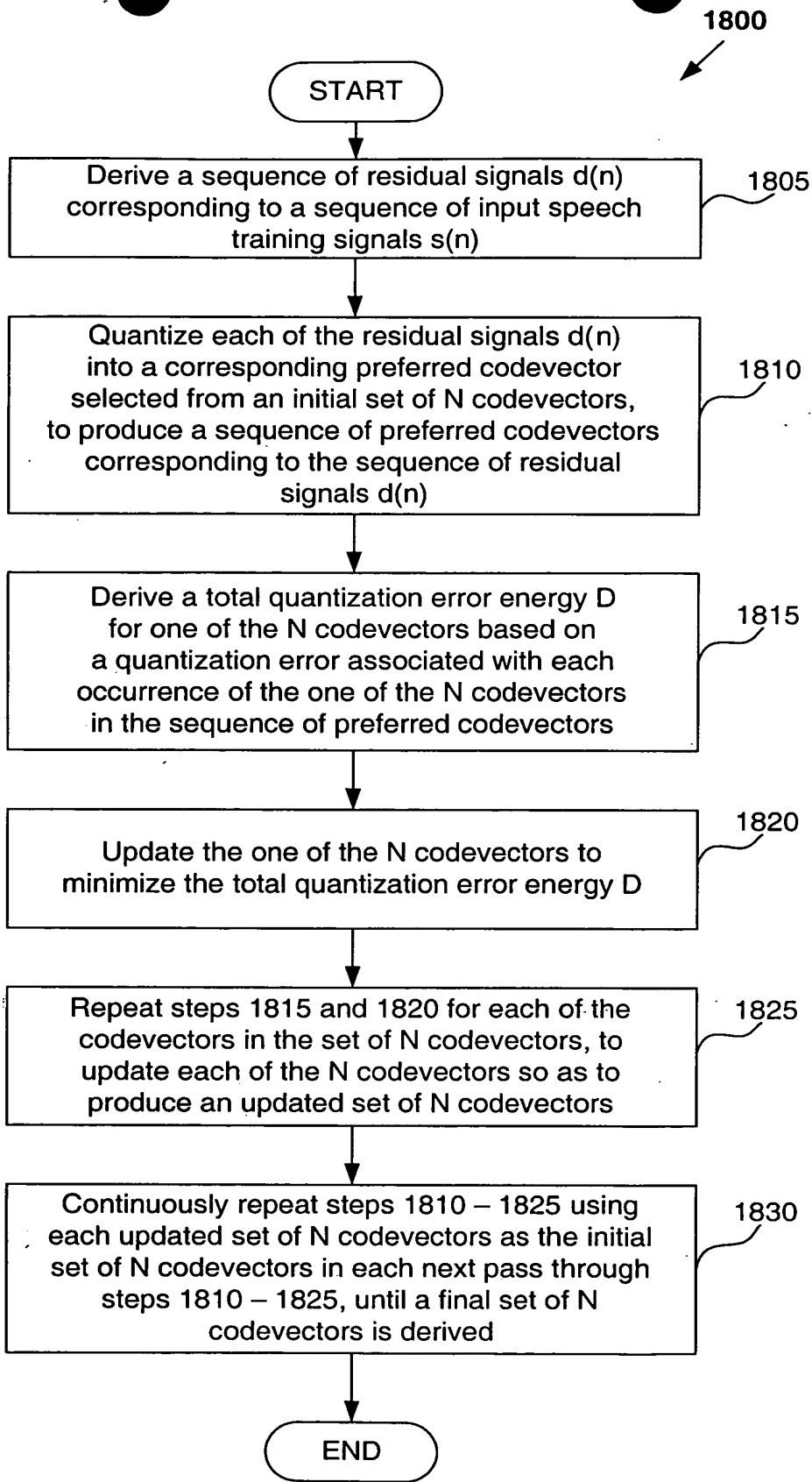
**FIG. 16A**



**FIG. 16B**

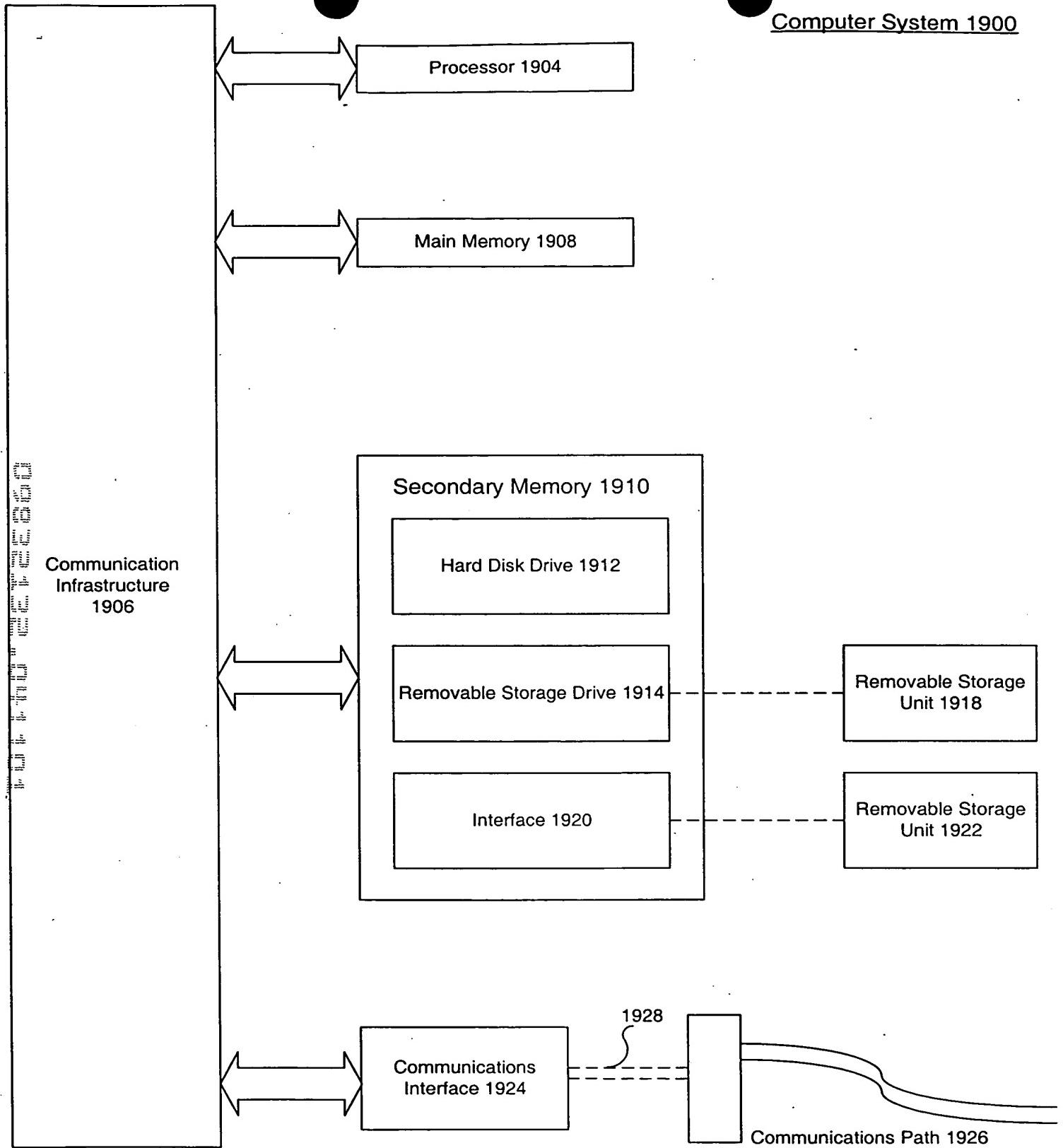


**FIG. 17**



**FIG. 18**

Computer System 1900



**FIG. 19**